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IN THE UNITED STATES AIR FORCE

By

CYNTHIA A. KENYON

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OF THE UNIVERSITY OF FLORIDA IN
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Abstract of Thesis Presented to the Graduate School
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RELATIONSHIP OF GENDER TO PROMOTION AND RETENTION RATES
IN THE UNITED STATES AIR FORCE

By

Cynthia A. Kenyon

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Chairperson: Arthur R. Williams
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Research studies have shown that historically women in organizations have experienced discrimination in compensation. The purposes of this research were to (a) examine the effects of gender on promotions; (b) estimate the financial effects of differential promotion opportunities; and (c) determine if a relationship exists between promotion and retention rates.

The study population consisted of all Air Force Nurse Corps (female-dominated), Biomedical Sciences Corps (male-dominated), and Medical Service Corps (male-dominated) officers eligible for promotion between 1977 and 1987 ($n = 13,338$). Comparative analysis revealed consistently lower promotion rates were experienced by the female-dominated group during the 11 year period. Calculated income horizons showed the Nurse Corps officer enjoyed a higher rate of return to investment than the Medical Service Corps officer, related to her earlier entry into the workforce and lower opportunity costs. Regression analysis indicated a strong positive relationship (Beta weight = .81867, $p < .0001$) between promotion and retention rates.

CHAPTER I INTRODUCTION

Women are not equally distributed throughout the labor force. They remain concentrated in certain female-dominated occupations (Blau & Ferber, 1985; Department of Labor, 1980; Larwood & Wood, 1977). Female-dominated occupations have been characterized as relatively low-paying, low prestige, and low opportunity jobs (Gutek, 1982). Nursing is approximately 97% female and one of the most sex-segregated occupations in the country (American Nurses' Association, 1986). Nursing is seen as work that comes "naturally" for women and as a result is generally undervalued and often ignored when it comes to compensation (Needleman & Nelson, 1987).

Job segregation by sex has been shown to be related to gender differences in various labor market outcomes, such as earnings and opportunities for advancement (Fuchs, 1971; Sommers, 1974; Treiman & Hartman, 1981; Treiman & Terrell, 1975). In the most recent survey done by the U.S. Bureau of the Census (U.S. Department of Labor, 1983) the median income of full-time female workers was reported to be approximately 60% of the median income for males. Researchers have repeatedly documented the existence of sex segregation in organizational career ladders and the tendency for men to dominate promotion opportunities (Baron & Bielby, 1985; Blau, 1977; Grimm & Stern, 1974; Kanter, 1977; Mennerick, 1975; Talbert & Bose, 1977). Although women represent 44% of the work force, the percentage of women managers is

calculated to be only 5 to 15% (McGillick & Fernandez, 1983). In the health care industry 77% of all workers are female, with nursing representing the largest category (U.S. Department of Health and Human Services, 1985), yet men still continue to occupy the formal positions of power in management. Women represent only 13.4% of physicians and 4% of chief executive officers in hospitals.

Social scientists have recognized that individuals both strive for and desire pay increases and promotion (Likert, 1967; Gannon, 1971). In fact, research has shown that employee groups with limited opportunities for advancement respond to this situation by physically and psychologically disengaging from the organization (Kanter, 1977). This disengagement is usually reflected in lower work involvement and higher turnover rates (Mobley, Griffith, Hand, & Meglino, 1979; Porter & Steers, 1973).

Purpose and Significance of the Study

The purpose of this research was to examine the relationships between gender and promotion and retention rates among the Air Force Health Professions. This study was designed in response to an identified research need outlined in the Nurse Corps Compendium of Research Topics 1988-1989. The proposed topic was to examine factors effecting decisions to leave or stay in the USAF Nurse Corps at the mid-career point. Concern stemming from the current nursing shortage generated an interest in identifying factors that enhance or impede retention of career officers.

Problem Statement

Nursing is the largest single professional discipline within the health care delivery system (Iglehart, 1987). Clearly, a shortage of registered nurses would seriously impact the ability of any health care

organization to meet both the quantity and quality of demands placed on it. Today, military and civilian health care organizations are experiencing just such a nursing shortage and are desperately seeking solutions for this recurring problem (Aiken & Mullinex, 1987; Givans, 1988; Winingham, 1988).

The current nursing shortage is just one in a series of shortages over the last four decades (Aiken & Mullinex, 1987; Yett, 1975). However, this is the first time a nursing shortage has cut across all categories of nurses and all regions of the country (Iglehart, 1987). The American Hospital Association reported that the proportion of vacant positions for registered nurses more than doubled between September, 1985 and December, 1986 (Aiken & Mullinex, 1987). The Air Force is also feeling the nationwide nurse shortage. Brigadier General Carmelita Schimmenti, former Chief of the Air Force Nurse Corps, was recently quoted as saying ". . . The Air Force would be short approximately 6,000 nurses if a war were to break out" (Givans, 1988, p. 14).

Whenever an experienced employee prematurely leaves an organization the costs can be high but during a labor shortage the costs are even higher. Additional costs are an outgrowth of increased advertising costs, added incentives, overtime pay and increased use of more expensive, private registry nurses to supplement staff. Costs for recruiting and orienting a registered nurse to an institution have been estimated at between \$3000 to \$5000 and have been known to run as high as \$7000 and \$8000 for an intensive care nurse (Hinshaw, Smeltzer, & Atwood, 1987). Costs for the military can run even higher when household moves and extensive training programs such as ROTC scholarships, five month internships and military indoctrination are added to the bill.

Recently, several nurses representing various health organizations testified on the current nursing shortage before the U.S. Senate Committee on Finance (1988). Barbara Curtis, testifying on behalf of the American Nurses' Association outlined the following reasons for the shortage:

Financial rewards that are not commensurate with responsibility; opportunities for upward mobility are lacking; nurses have insufficient authority and autonomy; work demands are increasing because of rising severity of illness; and nurses do not participate in management decisions regarding practice standard and support services. (U.S. Senate Committee on Finance, 1988, p. 45).

Neville Strumpf, testifying on behalf of the National League for Nursing stressed that "... compression of the wage structure creates profound retention problems in the nursing profession" (U.S. Senate Committee on Finance, 1988, p. 73). Nancy Greenleaf, representing the American Association of Colleges of Nursing, explained that "young women today are seeking professions which they perceive as more likely to provide both prestige and monetary rewards" (U.S. Senate Committee on Finance, 1988, p. 26).

For the most part, careers paths are determined by the structure of the employing organization. For example, the hierarchical shape of the organization and the existence of vacancy chains for career advancement provide employees a structural framework within which to work. Promotions offer employees an opportunity to improve their income, status, and job satisfaction. Pfeiffer (1983) showed that the sex composition of an organization can have an important effect on the monetary and psychic rewards received by employees. In the military system, a promotion for an officer results in an increase not only in pay but in rank and status which in turn increases the officer's access to and ability to impact organizational decision-making. In addition, a military increase in pay is used as the basis for calculating an

officer's retirement pay. Thus, for a military officer, a promotion, particularly at the higher ranks, is valued not only for present and future financial compensation, but also for the increase in autonomy, authority, and influence that accompanies a promotion.

The importance placed on promotions by individuals in both the military and society as a whole provides the stimulus for organizations to more closely examine their opportunity and reward structures. The current shortage of nurses further supports the need for all health care organizations to ensure that they do not intentionally or inadvertently discriminate against individual employees or groups of employees based on gender.

The purposes of this research were threefold: (a) to examine the effects of gender on promotions within a single organization using three separate groups (two male-dominated and one female-dominated); (b) to estimate the monetary effects of differential promotion opportunities for groups members by calculating rate of return to educational investment; and (c) to determine if a relationship exists between any gender effect on promotion and the organization's ability to retain group members.

Research Questions

Three research questions were addressed in this study.

1. Do officers in the Nurse Corps, a female-dominated group have lower promotion rates to field grade ranks than officers from the male-dominated Biomedical Sciences Corps or Medical Service Corps?
2. Do officers in the Nurse Corps have lower rates of return on investment in education than officers in the Medical Service Corps?
3. Would a decrease in opportunity for promotion during the eleven year period be associated with a decrease in officer retention rates in the three corps studied?

Definition of Terms

For the purposes of this research, the following terms will be defined as follows:

1. Corps. Corps is defined as "an organized subdivision of the military establishment" and "a group of persons having a common occupation" (Webster's Ninth New Collegiate Dictionary, 1987, p. 292).

2. Air Force Health Professions. The Air Force health professions are five distinct officer groups differentiated by their health professional training. Nurse Corps, Medical Service Corps, and Biomedical Science Corps are included in this study; Medical Corps (physicians) and Dental Corps (dentists) are excluded.

3. Nurse Corps (NC). This corps is female-dominated with 77% of its officers female. Members of this corps include all registered nurses both clinical and administrative, except nurses who are environmental health officers. NC specialists include nursing administrators, mental health nurses or specialists, operating room nurses, nurse anesthetists, OB/GYN practitioners, pediatric practitioners, primary care practitioners, educational coordinators, community health nurses, flight nurses, midwives, and clinical staff nurses.

4. Medical Service Corps (MSC). This corps is classified as male-dominated with 86% of its officers male. Members of this corps are all health service administrators. MSC officers include persons in several specialties: information system management, resource management, medical logistics, patient administration, facility management, medical readiness, and command and administration.

5. Biomedical Science Corps (BSC). This corps is classified as male-dominated with 80% of its officers male. Members in this corps consist of all allied health professionals who are not MSC or NC personnel. These officers represent the following fields: pharmacists, dietitians, podiatrists, physical therapists, optometrists, occupational therapists, physician assistants, social workers, psychologists, medical laboratory officers, health physicians, aerospace physiologists, biomedical environmental engineers, environmental health officers, medical entomologists, biomedical scientists, and veterinarians.

6. Company grade ranks. Company grade ranks refers to the three lowest ranks in the Air Force officer hierarchy and include in succeeding order of precedence: 2nd lieutenant, 1st lieutenant, and Captain. In the civilian sector, 2nd lieutenant and 1st lieutenant would be seen as entry level positions at the production level. Senior Captains would be viewed as middle managers in the civilian sector, representing first line supervisors in the organizational hierarchy.

7. Field grade ranks. Field grade ranks refers to the three upper level ranks in the Air Force officer hierarchy and include in succeeding order of precedence: Major, Lieutenant Colonel, and Colonel. In the civilian sector, Major rank would be at the middle management level representing first line supervisors and coordinators in the organization. Lieutenant Colonels in the civilian sector would equate to the beginning level of executive management as department or division heads and vice-presidents. Colonels represent the executive level in civilian organizations with titles such as President, Chief Executive Officer, Director, or Consultant.

8. Competitive category. Based on AFR 36-89 Promotion of Active Duty List Officers (1987), competitive category refers to "a grouping of officers who compete among themselves for promotion. The established categories are: line of the Air Force (LAF), judge advocates (JA), Medical Corps (MC), Dental Corps (DC), chaplains (CH), Medical Service Corps (MSC), Biomedical Sciences Corps (BSC), and Nurse Corps (NC)" (p. 3).

9. Promotion zones. Promotion zones are defined as "promotion eligibility groups consisting of officers on the active duty list in the same grade and competitive category. Officers eligible for promotion fall into one of the three promotion zones described below" (AFR 36-89, 1987, p. 3):

(1) Below-the-promotion-zone (BPZ)

(2) In-the-promotion-zone (IPZ)

(3) Above-the-promotion-zone (APZ)

10. Opportunity for promotion. Opportunity for promotion refers to an officer's chance or prospect for advancing upward in rank within the Air Force hierarchical structure based on previous IPZ promotion rates for that officer's competitive category compared to IPZ promotion rates for other competitive categories.

11. Promotion rate. Promotion rate is defined as the percentage of officers in-the-primary zone (IPZ) for promotion who were selected for promotion to the next grade in that year. Promotion percentage rates are calculated as the percentage of IPZ eligibles selected based on the total number of officers eligible in the promotion zone.

12. Retention rate. Retention is defined as the Air Force's ability to retain trained, experienced health professionals on active duty after they have completed their initial obligation. For this study,

retention rates represent the percentage of officers who remain on active duty based on the total number of officers in that category who are eligible to remain at that specific period of time in their careers.

13. Internal Rate of return. Internal rate of return on investment is defined as that rate which equates the present value of returns on an investment for a given individual to the present value of costs for that same individual (Lloyd & Niemi, 1979, p. 109). In this study, the internal rate of return is calculated to incorporate the time value of money, and the focus is on the interest rate that equates the present value of future returns from the initial investment.

14. Investment in education. Investment in education refers to investments made by an individual in education either monetarily (to pay for tuition) or in time spent learning rather than working and earning income.

Limitations

There are three limitations to this study. First, the study population is restricted to the Air Force and may not be representative of other military or health care organizations. The Air Force was selected because it has the largest proportion of women of any of the military services. In addition, Air Force health care professionals that comprise the study groups are representative of health care professionals found in most civilian health care organizations.

Second, the research design and scope of this study imposed limits on examining the relationship of retention rates for Air Force groups to any variable other than promotion opportunities. And finally, the use of a priori probabilities to examine present promotion probabilities implicitly assumes that future performance is a function of past performance.

CHAPTER II REVIEW OF THE LITERATURE

This chapter has been divided into two sections. First the theoretical framework, equity theory, is presented. The second section is a review of the literature in the major areas: (a) an overview of theories of gender discrimination, (b) promotion, and (c) retention.

Theoretical Framework

Any exchange between individuals has the potential for being perceived as inequitable (Adams, 1965). This assumption formed the basis for J. Stacy Adams' theory of equity. Although applicable to all settings, for this discussion, equity theory is described in terms of its application to the work setting.

According to Adams, employees believe they are entitled to receive valued rewards from employers based on their contributions. An employee's perception of justice in the workplace is determined by that employee's perception of how he fares in relation to a comparative employee or group within the organization.

In the comparison process, an employee measures his ratio of inputs to outcomes against another employee or group's ratio of inputs to outcomes to see how he/she measures up (Adams, 1963; Walster, Berscheid, & Walster, 1973). If this comparison between another employee or referent group reveals inequity, tension is created in the employee which stimulates activity focused on restoring the balance (Adams, 1963, 1965, 1968; Walster et al., 1973). An employee's potential inputs or

contributions to the organization can include education, intelligence, experience, skill, seniority, effort, appearance, and health (Adams, 1965). Adams believes that a perception of equity produces satisfaction and better performance and inequity leads to anger and dissatisfaction (Adams, 1963, 1965; Walster et al., 1973).

Numerous studies have attested to the validity of equity theory. Research exploring inequity has supported the relationship between worker perceptions of equity and job satisfaction (Klein, 1973; Pritchard, Dunnette, & Jorgenson, 1972; Vroom, 1964; Zelenzik & Moment, 1964). Examinations of worker's job performance revealed a strong correlation between feelings of inequity and a decrease in the quality or quantity of worker performance (Evan & Simmons, 1969; Lawler, 1968; Lawler & O'Gara, 1967; Pritchard, Dunnette, & Jorgenson, 1972). Studies have also demonstrated that an increase in turnover is related to employee dissatisfaction stemming from perceptions of inequitable treatment in the workplace (Dansereau, Cashman, & Green, 1973; Finn & Lee, 1972; Telly, French, & Scott, 1971). Equity theory is believed to provide an explanation for motivation--when employees perceive the work situation as fair, they will accept it (be recruited) or continue it (be retained) (Belcher, 1974).

As a highly regarded general theory of social behavior, equity theory provides a useful framework for examining the effects of organizational policy on gender behavior in the area of career decisions. In this retrospective study research questions were designed to assess, from a Nurse Corps Officer's perspective, one aspect of the employment exchange relationship, promotion opportunity, using the Medical Service Corps and Biomedical Sciences Corps as referent groups.

Literature Review

Overview of Economic Theories of Gender Discrimination

Geraldine Ferraro delivered a powerful message to the nation on gender discrimination when she declared:

Every father is diminished when his daughter is denied a fair chance. Every brother is a victim when his mother is denied fair pay. But when we lower barriers, open doors, and free women to reach wherever their dreams will take them--our talents are multiplied and our country is stronger. (Van Buren, 1988, p. 30)

Despite the fact that women's labor force participation has risen dramatically over the last two decades occupational segregation still exists and women continue to earn less than men. The majority of women remain clustered in a small number of low-paying predominantly female occupations. Nursing is approximately 97% female and one of the most sex segregated occupations in the country. The largest occupational category for men is described as the "executive, administrative, managerial category" (Rytina & Bianchi, 1984). Women on the other hand, continue to be underrepresented in this category ". . . they make up one-third of the current workforce in the United States, yet they represent less than 5% of middle management and less than 2% of business executives" (Lawless, 1979, p. 444).

According to economists gender discrimination occurs ". . . whenever workers who are equally productive on average are treated differently, either in hiring, wage rates, job assignment, promotion, or firing" (Lloyd & Niemi, 1979, p. 193). Economists have developed several theories based on competitive markets to explain differential treatment of men and women. A competitive market has been described as:

One in which wages and income of employees are determined by the demand by firms for employees and by the number or supply of those employees or professionals . . . In a competitive market, therefore, a person's income depends on three things: (a) the type of output or service the person is able to produce, (b) the value or price of that service in the market, and (c) the number of people in the occupation or profession. (Disch & Feldstein, 1986, pp. 24-25) [Italics added above.]

Economic theories of discrimination can be divided into two schools: the neoclassical and the structural. Neoclassical theories focus on characteristics of the individual worker and structural theories focus on characteristics of the market place.

The human capital approach proposes that individuals differ in certain characteristics (human capital) and when these differences are brought into the employment exchange they affect individual outcomes in the marketplace (Becker, 1964). Workers make decisions to invest in themselves through time or money, in education, on-the-job training, and continuous work experience. Human capital theorists explain differential labor market outcomes as a matter of individual choice. The supposition is that women choose to invest their time in family responsibilities, dropping out of the labor market for periods of childbearing and childrearing. While out of the labor market women's skills depreciate and seniority time is lost, thus women should earn less than men because their investments are less. However, this theory fails to explain research studies that compared male and female workers with equal qualifications and still found wage disparities remained (Larwood & Wood, 1977, Treiman & Hartman, 1981; Treiman & Roos, 1983).

Polachek (1981) advanced a theory of personal choice which proposes that the woman knowing she plans to drop out of the labor force chooses an occupation that will be easy to enter and leave and will have the smallest earnings loss from any absences. According to Polachek time out of the workforce would be the most detrimental to managerial careers. However, England (1984) in her research showed that the amount a woman's

wages dropped from being out of the labor force was the same in male-dominated as female-dominated occupations.

The overcrowding approach (Bergmann, 1974) theorizes that if too many workers were trained in a specific occupation, they could face a low demand for employment resulting in depressed wages. Crowding can be caused by having too many people trained in the same occupation or by exclusion of a particular group from other occupational training opportunities. Bergman (1974) believes women are channeled into female-dominated occupations either by personal choice (socialization) or by structural affects. However, according to England's (1984) research female-dominated occupations are no more crowded than male-dominated occupations.

Finally, "tastes" for discrimination represent individual employers choosing to discriminate (Becker, 1957). In this case employers may be willing to pay a price to indulge their "tastes" for employing only members of a specific group. Error discrimination can follow if discriminating employers underestimated the real capabilities of qualified (female) candidates. Statistical discrimination occurs when employers base personnel decisions on productivity averages of men and women. One example would be an employer who decides that since most women don't know how to repair cars he won't hire the female applicant for the job in the motor pool. Another example would be an employer deciding not to select a qualified female applicant for promotion because he believes females can not be counted on, because they always leave to get married or have babies.

The existence of sex biases favoring men has been extensively documented (Broverman et al., 1972; Rosaldo & Lamphere, 1974; Steinmann &

Fox, 1966). Stereotypes about women and their roles have been shown to negatively affect women in the labor market (Blau, 1977; Larwood, Gutek, & Gattiker, 1984; Nieva & Gutek, 1981). Evidence is overwhelming that women's work is consistently undervalued compared to men's work (Broverman et al., 1972; Nieva & Gutek, 1980; Shapela & Viviano, 1984; Sommers, 1974). The traditional subordinate role of women in society is frequently offered as an explanation for this bias.

Structuralists examine institutional characteristics and organizational processes to explain discrimination. Segmentation of the labor market occurs when different groups of workers in the labor market are isolated or separated leading to different wages, rewards, and opportunities (Doeringer & Piore, 1971). Numerous research studies have demonstrated the existence of sexually differentiated or segmented labor markets in which women do not fare well in comparison to men (Larwood & Wood, 1977; Madden, 1985; Nieva & Gutek, 1981; Rosenbaum, 1985). These studies showed that women tend to have lower positions than men in organizational hierarchies (Blau & Ferber, 1985; Larwood & Wood, 1977; Malkiel & Malkiel, 1973).

A segmented or dual labor market consists of primary and secondary jobs. Primary jobs have good pay and working conditions, few ports of entry, long promotion ladders, worker stability, and job security. The secondary jobs have low wages, easy entry, poor working conditions, high turnover rates, short or no promotion ladders, generalized skills, and limited job security. Wolf and Rosenfeld (1978) believe segmentation of labor markets could explain why women's occupational status does not seem to respond to length of work experience. Treiman and Hartmann (1981)

describe nursing as an example of the secondary segment of the labor market.

Kanter (1977) believes that the proportion of women in a group affects the rewards received by group members. Kanter maintains that women are positioned to fill different roles in the organization than men, they are placed in expert rather than decision-making roles. Most managers are men and they tend to exclude women from authority positions because men want to "carefully guard power and privilege for those they see as their kind" (Kanter, 1977, p. 48). Conflict theory also says that groups with power will try to keep their positions by excluding others (Coverman, 1986). Because of gender stereotypes women become stuck in an apprenticeship status providing help and service through their peripheral positions in the organization but not moving on to independent command positions (Epstein, 1976). While men may serve in apprenticeship roles, it is only on a temporary basis; women's apprenticeship roles often develop into a permanent job. According to Nivea and Gutek (1981) "the positioning of women into helper roles acts to absorb them into the established structure, thus benefiting from their contributions without having to pay in rank, salary, and recognition" (p. 61).

Historically, women in the military have experienced discrimination in promotion opportunities as a result of government policy and traditional and institutional restrictions (Holm, 1982). In 1951, Congress formed the Defense Advisory Committee on Women in the Services (DACOWITS) to investigate and monitor the position of women in the Armed Forces. Recently DACOWITS called for "elimination of double standards in policies affecting servicemen and women" (Schill, 1989, p. 18). One specific recommendation made was that the Secretary of Defense

". . . should take all necessary steps to resolve career problems for military nurses, especially supporting the exclusion of nurses from the authorized grade strength limitations" (p. 18). The committee went on to report that "retention of highly qualified nurses is declining because of lack of promotion opportunities commensurate with their professional skills" (Schill, 1989, p. 18). Another recent article appearing in the Air Force Times (Bird, 1989) addressed the promotion problems faced by military women in the Line of the Air Force (LAF) as a result of the 1948 Combat Exclusion Law which bars women from jobs involving risk of combat. This legislative restriction has been shown to hinder female officers' careers and promotion opportunities (Holm, 1982).

Promotion as Compensation

Compensation represents the transaction between the employee and the organization in which various financial and nonfinancial rewards are exchanged for work performed (Belcher, 1974). Financial rewards can include promotion, cash payments, various insurance plans, and pensions. Nonfinancial rewards can include promotion, working conditions, flexible working hours, travel, challenging jobs, and opportunities to meet new people.

Research has shown that an organization's compensation policies directly influence the decisions an individual makes about whether to join an organization, whether or not to come to work, and when to quit (Mobley et al., 1979; Porter & Steers, 1973; Steers & Rhodes, 1978). Individuals tend to join and remain in those organizations that provide the most desirable rewards.

A promotion is classified as a financial reward because promotion generally results in an immediate increase in salary and an overall increase in lifetime earnings when used as a basis for determining retirement pensions. A promotion can also be classified as a nonfinancial reward based on the increase in status, prestige, and improved feelings of self-worth that generally accompany promotion.

America is known as the land of opportunity in part because American society supports the premise that all individuals should be given the opportunity to improve their position in life. Promotion policies help to reinforce this concept among employees (Rosenbaum, 1984). A promotion provides upward mobility and is a reward highly valued by employees (Belcher, 1974; Gannon, 1971; Likert, 1967; Rosenbaum, 1984). The chance of receiving a promotion has been shown to affect an employee's aspirations (Chinoy, 1955), leadership style (Hetzler, 1955; Levenson, 1961), and a variety of other attitudes and behaviors (Kanter, 1977; Rosenbaum, 1976).

Compensation policies in organizations are usually designed to incorporate the high value employees place on promotions. Motivational research has demonstrated that inequity in the employment exchange can create dramatic reactions that affect employee behavior and performance (Mahoney, 1979). According to Rosenbaum (1984), promotion opportunities are an effective way of controlling employees by offering the possibility of material rewards and status to a far larger number of employees than can possibly attain them. However, researchers caution that opportunities for promotion must be allocated in ways that provide hope and motivation to the largest number of employees if an organization is to derive the maximum benefit (Edwards, 1979; Stinchcombe, 1965).

Promotions and Nursing Research

Although organizational researchers and sociologists have identified the importance of promotion in most people's work lives, no empirical studies could be found in the nursing literature that had promotion or career advancement as their primary focus. However, indirect reference to the importance of promotion to nurses was found in literature on turnover, comparable worth, and the nursing shortage.

Numerous studies on turnover have shown that equitable personnel policies on promotion are a strong employee motivator and can prevent job dissatisfaction that leads to higher turnover. This finding is supported in nursing research studies on turnover which show that opportunity for advancement in the organization has proven to be an important job satisfier leading to work force stability (Munson & Heda, 1974; Slavitt et al., 1978; Wandelt, Pierce, & Widdowsen, 1981). Price and Mueller (1981) in a study conducted with over 1,000 registered nurses, found that nurses who perceive the greatest employment opportunities outside the hospital and perceive limited promotional opportunities within the hospital are also the ones who are least likely to plan to stay in the hospital. Another study tested the effect of a clinical ladder program on nurse satisfaction and retention and found that retention did increase when this alternative promotion method (clinical vs. administrative) was employed (Barhyte, 1987).

Comparable worth studies offer another perspective on limited promotion opportunities in nursing. When employers make decisions on which employee to promote, it is acceptable practice to take into consideration differences in education, experience, and supervisory ability, but not sex differences. Eight nurses recently brought suit

against the City of Denver because male-dominated professional and administrative occupations requiring comparable education, experience and supervisory responsibility received salaries of \$39 to \$138 more per month than comparable nursing positions (Schrader, 1976). Although their primary focus is on equal pay for jobs of equal value, pay equity studies usually emphasize the financial implications of shortened career ladders on lifetime earnings (Mahrenholz, 1987; Treiman & Hartmann, 1981; Weingard, 1984). Male-dominated occupations have a rising income curve but female-dominated occupations such as nursing have an almost flat income curve exhibited by dead-end careers with little promotional opportunity. In one study researchers investigated the affect on wage rates of gender dominance within selected hospital jobs and found that hospital jobs held mainly by women received lower wages than those held mainly by men (Muller, Vitali, & Brannon, 1987). For example, the findings showed that a staff pharmacist was paid more per hour than a staff nurse and a chief pharmacist was paid more per hour than a head nurse or nurse supervisor.

Still other researchers focus on the stereotypical role of women as it affects female-dominated professions like nursing. McGillick and Fernandez (1983) believe that limits on opportunities for nurses to advance to executive positions will remain until ". . . the cultural image of nurses as servants and subordinates is changed" (p. 26). One research study examined the experiences of men in female-dominated professions and found in nursing empirical evidence that men were disproportionately represented in the higher status and administrative positions (Grimm & Stern, 1974).

The most impressive support found for the importance of career advancement to nurses was in literature that explored nurse shortages. Numerous Congressional hearings over the years on this subject stand as testament to the profound impact nurses have on this nation's health care system. Although economists and nurse researchers have exposed the chronic nature of nurse shortages, the problem still persists. Yet, many of the reasons given to explain nurse shortages are the same reasons given to explain why promotions in the work place have proven such a valuable compensation tool. Promotions can result in more challenging positions and increase an employee's financial status, social status, authority, and ability to impact organizational policy. The long overlooked importance of promotion opportunities to nurses may provide an explanation for the mounting frustration of practicing nurses and the apparent negative image of the profession as an attractive career choice.

The hospital is still the predominant place of employment for nurses, with two-thirds of the nursing labor force employed by hospitals (Corley & Mauksch, 1988). However, current high turnover rates in hospitals send a clear message of dissatisfaction with hospital nursing practice. In a 1982 report to Congress (U.S. Department of Health and Human Services, 1982) the Secretary of Health and Human Services noted that: "In the absence of compensation for pressures in the work setting, nurses move from one institution to another, or from hospital nursing practice to another field of nursing to find some level of professional and personal fulfillment" (p. 26). The Secretary also blamed inadequate starting salaries and inadequate salary differentials for new and experienced nurses as a major cause of the shortage revealing that:

"Experienced nurses resent the fact that there is little, if any, monetary reward for clinical experience. They take exception to the emphasis placed by hospitals on recruitment of new staff, as opposed to increasing the incentives of those already employed to remain in practice at the hospital" (p. 29). The report went on to cite other factors that were known to affect nurses' job satisfaction: opportunity for advancement, participation in institutional policy-making, job status, and autonomy.

Five years later in a hearing before the Senate on nurse shortages many of the same points were reiterated. This time there was increased urgency for change heightened by evidence reporting that the shortage had spread throughout all nursing settings and involved a decline in enrollments in schools of nursing (United States Senate Committee on Finance, 1988). Again changes in economic rewards were cited as absolutely essential to reverse the trends. In his opening statement Senator George Mitchell, Chairman of the Subcommittee on Health, said, "One of the reasons often cited for nurses leaving the profession is the lack of career advancement after the first few years" (p. 2). Inadequate compensation for level of responsibility, education, experience, and performance compared with other health care professionals was also cited as contributing to the shortage. Several experts testified that expanded career opportunities for women brought about by social and legislative changes over the last twenty years were contributing to the decline in popularity among women of traditional female professions like nursing. As one witness testified, "women are no longer constrained by limited views of what is an appropriate career choice. . . . Young women today

are seeking professions which they perceive as more likely to provide both prestige and monetary rewards" (p. 26).

Promotion in the Air Force

According to Baron (1984), promotions within organizations are affected by the structure of organizations. This seems especially true for the military. A promotion in the military takes on added significance for its members due in part to the heavily institutional and communal nature of military organizations. According to Moskos (1977), "members of an institution are often viewed as following a calling; they generally regard themselves as being different or apart from the broader society and are so regarded by others" (p. 42). He says: "institutional membership is congruent with notions of self-sacrifice and dedication" (p. 42). Moskos also points out that all military members are subject to "military discipline and law [and are unable to] resign, strike or negotiate over working conditions [instead they] trust in the paternalism of the institution to take care of its own" (p. 42).

A noted compensation researcher, Thomas Mahoney (1979) believes that "the effects of employment on social status depend on the norms of the culture or subculture of which the person is a member" (p. 77). In the military culture, rank indicates a person's authority and status in the hierarchy. Air Force Regulation (AFR) 35-54 defines military rank as "the relative position or degree of precedence given military persons which marks station and confers eligibility to exercise command or authority in military service within the limits stated by law" (p. 1). Officially, grade in the military "means a step or degree in a graduate scale of office or rank, that is established as grade by law or

regulation." Grade and rank are two terms often used interchangeably in the military. Basically, rank is viewed as a title and grade refers to the authorized pay level. Table 2-1 lists the grades and ranks of officers in the Air Force in succeeding order of precedence. Seniority in rank for officers in the same grade is determined by length of service and the date of appointment to that grade. In civilian organizations grades are generally determined by characteristics of the job unlike the military system where the focus is usually on the individual not the specific job.

The Air Force has a closed personnel system, vacancies are filled internally by promotions with traditional declining promotion opportunities as one advances up the ranks. The promotion process is outlined in Air Force Regulation 35-89 (1987): "The fundamental purposes of the officer promotion program are to select officers through a fair and competitive selection process that advances the best qualified officers to positions of increased responsibility and authority and provide the necessary career incentive to attract and maintain a high quality officer force" (p. 3).

Eligibility for consideration for promotion to a higher rank is determined by an officer's grade (rank), time in grade (rank), and length of service. Officers eligible for promotion fall into one of three zones: BPZ or Below-the-Promotion-Zone refers to officers in the secondary zone who would be considered for an "early" promotion due to exceptional potential; IPZ or In-the-Promotion-Zone refers to new eligibles or first time eligibles in the primary zone for promotion; APZ or Above-the-Promotion-Zone refers to those officers not selected when

Table 2-1

Grade and Rank of Officers in the United States Air Force

Grade	Rank
0-10	General
0-9	Lieutenant General
0-8	Major General
0-7	Brigadeer General
0-6	Colonel
0-5	Lieutenant Colonel
0-4	Major
0-3	Captain
0-2	First Lieutenant
0-1	Second Lieutenant

they were in the primary zone or old eligibles that have been passed over at least once for promotion.

The term company grade officers collectively refers to officers in the lower levels of the officer hierarchy: second lieutenants, first lieutenants, and captains. Selection for promotion to First Lieutenant is noncompetitive. A second lieutenant is deemed fully qualified for promotion after completing 24 months time in grade based on date of rank to second lieutenant. Promotion eligibility for captain is the start of the competitive process. A central selection board is held for the purpose of selecting the best, eligible first lieutenants for promotion to captain. Once selected, first lieutenants are promoted after serving 24 months time in grade based on date of rank. First lieutenants are not given early consideration for below-the-zone (BPZ) promotion to captain.

The term field grade officers collectively refers to officers in the upper levels of the Air Force officer hierarchy: majors, lieutenant colonels, and colonels. Eligibility criteria for field grade promotions differs for each competitive category from year to year because of the Air Force's need to maintain a balance between the number of field grade officers in each competitive category and the number of field grade officers permitted on active duty by law.

On September 15, 1981, the Defense Officer Personnel Management Act (DOPMA) became effective. This act passed by Congress made sweeping changes to the promotion system. Under DOPMA Congress set limits on the number of field grade officers that can be on active duty at any given time. Because validated requirements for field grade officers are greater than permitted under DOPMA each competitive category has to be constrained to meet the ceilings imposed by Congress. The number of

vacancies each year in each competitive category coupled with the established ceiling for that year determines the number of field grade officers that can be promoted.

Unlike most civilian pension plans, retirement pay under the military system is of no value to a person who does not serve long enough to acquire entitlement. According to DOPMA legislation an officer twice passed over for promotion is subject to involuntary separation unless the officer possesses special skills needed by the service and is selected for continuation on active duty. The selective continuation of officers in grades above first lieutenant is an additional feature of DOPMA which provides flexibility for the services to either increase or reduce officers as needed to meet force requirements.

Another important change raised the requirement for guarantee of tenure to retirement from those selected for major to those selected for lieutenant colonel. This "up or out policy" means that majors who twice fail selection for promotion to lieutenant colonel and are not within two years of qualifying for retirement will be separated from active duty without a pension unless selected for continuation. Therefore, limited promotion opportunities will only serve to further intensify this threat to an officer's financial and job security that was brought on by changes in the promotion system. All of this coupled with the traditional view held by officers of what constitutes success in the Air Force, "that you've got to be promoted to O6 [colonel] or you really haven't had a successful career as an officer" (Ginovsky, 1988, p. 3), explains the added importance of and increased competition in field grade promotions.

A review of the literature revealed a scarcity of research on women in the military other than historical accounts of wartime experiences and

biographical records. In fact, Charles Moskos in 1971 pointed out that the position of women in military organizations was almost completely unresearched; little has changed since 1971. Most of the research has focused on women's exclusion from combat roles (Binkin & Bach, 1977; Goldman, 1973; Holm, 1982). According to Goldman (1973): "New (female) recruits--both officers and enlisted personnel--think of themselves as entering a service which has strong emphasis on equal opportunities, made more emphatic by the fixed and uniform pay rates . . . They assume that women in the military have better job security than in civilian employment" (p. 902). One study that examined the promotion experience of enlisted women in the military showed no systematic differences between the promotion patterns of men and women (Butler & Brewer, 1978).

Gender bias in performance evaluations has been shown to have a negative effect on career advancement for women. In a recent study, Patricia Thomas (1987) investigated whether gender influences performance evaluations of Naval officers. After conducting a content evaluation of 2139 officer fitness reports she created two pseudo-narratives from the compiled list of descriptors that had typically been used to describe a male and a female officer. The pseudo-narratives contained no references to gender. Each narrative was assigned a fictional last name and then reviewed at a mock promotion board by Naval officers who were given instructions to select one for promotion. Board members overwhelmingly selected the officer whose pseudo-narrative was developed using descriptors that had been coded male.

Jeanne Holm's (1982) comprehensive book detailing the accomplishments of women in the military from the past to the present provided the most extensive and enlightening account of women's

employment in military organizations. Although the focus of the book is on the experiences of enlisted women and officers in the Line of the Air Force (LAF), it does provide a detailed account of the career barriers faced by all women, including nurses, by tracing historical government policy and institutional resistance that have limited promotion opportunities. Holm (1982) recounts that, "Women's participation in the military is not, as many believe, of recent origin--it goes back to our nation's beginnings . . . Many thinking Americans, including some military experts and members of Congress, have questioned the wisdom of placing so much reliance on the 'weaker sex'. . . they fear too many women will diminish the combat readiness of the forces" (p. xv). She goes on to note that:

The acceptance of nurses (1901), even with their dubious status, was the first breakthrough for women insofar as a military profession was concerned . . . they accepted, as society in general did, the premise that the military was a male institution whose social and occupational context was permeated by the cult of masculinity. So it was in 1900. So it was in 1917. And so it is to a great extent in 1982. Acceptance of women as full and equal participants in this masculine milieu is seen by many as the ultimate test of society's willingness to compromise with long-established traditions. (p. 11)

Holm (1982) goes on to trace the historical limits placed on the careers of Air Force women. Not until 1967 were limits removed by legislation that authorized female officers to be promoted to General and to permanent colonel; also the 10% ceiling was removed on the number of regular officers who could serve as permanent lieutenant colonels and the retirement rules were equalized. In 1971 the Air Force promoted Jeanne Holm as its first brigadier general and a few months later E. Ann Hoefly, Chief of the Nurse Corps, as the first NC brigadier general. Holm (1982) does report that, "historically of the four services, Air Force women had

fared the poorest in the promotion process (p. 277). However, no empirical studies could be found that examined promotion patterns of female officers in the Air Force.

Retention

Retention refers to the ability to keep an employee in the pay or service or an organization. Today nursing represents up to 65% of a hospital's labor force (Sredl, 1982). Successful recruitment and retention of nurses is imperative for health care organizations to maintain the level of quality patient care needed in today's highly competitive market.

Turnover is defined as the total number of separations which occur during a specific period in an organization (Sredl, 1982). Turnover for professional nurses has reached alarming levels, having been estimated to be as high as 35-60% annually in some hospitals (Sredl, 1982). Organizational characteristics such as compensation (Bowey, 1974; Lawler, 1971; McClosky, 1974; Wandelt, Pierce, & Widdowsen, 1981), and employee participation in decision-making (Alexander et al., 1982; Price & Mueller, 1981; Weisman et al., 1981) have been shown to influence turnover. Job stress stemming from a lack of participation in policy and practice decisions has also resulted in higher nurse turnover rates (Magill, 1982).

The ability of a health care organization to meet its goals can be compromised because of instability in the nursing staff (Consolvo, 1979; Kahne, 1968; Price, 1977; Revans, 1964) and high monetary costs due to turnover (Cawsey & Wedley, 1979; Concolvo, 1979; Donovan, 1980). In addition, available or better job opportunities in the community and perceived limited internal promotional opportunities influence an

employee to leave the organization (Price & Mueller, 1981). Seybolt (1986) identified the level of consistency and equity in organizational policies across work groups as a critical issue in retention.

Research has shown that job satisfaction has the strongest influence on intent to stay for nurses. Characteristics related to job satisfaction that affect turnover include: position in the hospital hierarchy (Anderson & Haag, 1963; Munson & Heda, 1974; Slavitt, Stamps, Piedmont, & Haase, 1978), status (Herzberg, Mausner, & Snyderman, 1959; Koerner, 1981), pay (Lerch, 1982; Slavitt et al., 1978), and autonomy (Donovan, 1980; Grandjean, Bonjean, & Aiken, 1982; Marriner & Craigie, 1977; McClosky, 1974). Seybolt (1986) examined various career stages and nurse turnover and discovered that at the entry level the overall job and its career implications affected the intent to leave. At the advanced career stage, satisfaction becomes more critical for turnover than at other stages; and, at the later career stages questions such as "Why haven't we been promoted?" (p. 30) are often asked.

An increasing demand for nurses coupled with a decreasing supply of nurses has once again brought nurse recruitment and retention issues to the top of the health care management priority list. Experts believe that the cost of recruiting and orienting a professional nurse to a health care organization is between \$3000 and \$5000 (Hinshaw, Smeltzer, & Atwood, 1987). Although a certain percentage of employee turnover in an organization is viewed as healthy, there should be grave concern when valued employees leave prematurely and many hospitals find half their staffing turning over annually.

Several recent articles in military trade publications over the last year have reported that the Air Force is also experiencing difficulty in

recruiting nurses. A two page article (Givans, 1988) documenting this recruiting problem appeared in the March 7 issue title "AF Feeling Nationwide Shortage of Nurses, Too." According to then Chief of the Nurse Corps, Brigadier General Carmelita Schimmenti, the Nurse Corps is currently experiencing nurse recruiting problems similar to those found in the civilian health sector. She reported that "the only real experience (until now) the Air Force has had with severe nursing shortages was during the 1970s" (p. 14). She closed the interview by stressing that "the Air Force leadership is particularly concerned with the impending nurse shortage not only because it affects readiness (for war), but also because quality medical benefits are viewed as an important factor in retaining the line of the Air Force" (p. 56).

A March 14 article (Dalton, 1988) related testimony given before Congress on critical Air Force personnel issues by Lieutenant General Thomas Hickey. The article reported that Hickey testified on the difficulties encountered by the Air Force in recruiting nurses because of the national shortage. The last year has also seen a flurry of letters to the editor from dissatisfied nurse officers describing their discontent with the system. One such letter writer offered limited promotion opportunities as an explanation for nurse recruiting and retention problems stating, "Young AF nurses get the message clearly: promotion in the Nurse Corps is very limited . . . it is inconceivable to me that Nurse Corps promotions should be so much lower than for the other corps" (Bostek, 1988, p. 20).

In the November 14 issue, another interview focusing on recruiting and retention problems titled "Nursing Chief Battles Shortages, Discontent" (Winingham, 1988) appeared in the Air Force Times. A letter

to the editor followed in the December 19 issue from another dissatisfied nurse pointing to limited promotion opportunities as a reason for the problems ". . . nurses seem to have the lowest promotion rate of any group . . . We should acknowledge that the nurses' promotion pyramid is narrower than that of the overall Air Force . . . Perhaps it is also time to let the nurses know that a successful career for the majority probably will end at the major level" (Kiehle, 1988, pp. 29-30). In his annual interview, the Air Force Surgeon General (Miller, January, 1989) also discussed the nursing shortage, ". . . recruiting needs will prove challenging, placing an even greater emphasis on retaining well-qualified health professionals" (p. 47). The latest article to appear in the Air Force Times (Willis & Balman, 1989) reported on the Department of Defense plans to seek legislation to pay bonuses to all new nurses entering the service and provide specialty pay to all nurse anesthetists on active duty. This would be the first time in the history of the Air Force that, "military nurses were given compensation beyond the basic pay that all members receive" (Willis & Balman, 1989, p. 6). According to the article (Willis & Balman, 1989), the Assistant Secretary of Defense in testimony given before the Senate Armed Services Committee stated that, "the extra pay is necessary to attract more new nurses and to encourage experienced ones to remain in the service . . . the effects of this pay gap (with civilian nurse salaries) already have appeared in service recruiting and retention figures" (p. 6).

CHAPTER III METHODOLOGY

The first section of this chapter describes the study design used to analyze promotion patterns and their impact on retention and income for members of male-dominated and female-dominated groups within a military organizational structure. The second section defines the setting chosen for the study. The third section presents a detailed description of the sample groups. The last section identifies the data required for the study, the sources of the data, and describes the statistical methods employed in analyzing the data.

Design

This was a descriptive, retrospective study. The intent of the research was to compare promotion and retention rates of male-dominated and female-dominated Air Force Health Professionals. The research was correlational and comparative, designed to identify and examine relationships among study variables. The design was selected because the study variables (gender, promotion, and retention) did not readily lend themselves to experimental manipulation. Historical data were obtained from official Air Force sources for analysis.

A retrospective design allows the researcher to observe the manifestation of some phenomenon in the present and then try to identify and link its origins or causes to the past (Polit & Hungler, 1987). For example, in this study to explain promotion rates for Nurse Corps officers past linkages such as promotion opportunities over time were examined.

Retrospective research offers the advantage of examining variables after they have occurred naturally rather than after artificial manipulation in a laboratory experiment (Polit & Hungler, 1987). This lack of artificiality means the findings may be more likely to be generalizable to other organizational settings. However, faulty causal interpretation of the data is often cited as a major disadvantage of this kind of research (Polit & Hungler, 1987). For example, one should not assume that the three groups studied in this research were similar at the beginning of this investigation. In this study, pre-existing differences within group members may be a plausible alternative explanation for any observed differences in promotion and retention.

Setting

This study investigated promotion and retention patterns for officers in the health professions of the United States Air Force over an eleven year period from 1977 to 1987. The military services: Army, Navy, Air Force, and Marines are organized under the Department of Defense, considered to be the largest employer of military and civilian workers in the United States. In comparison to the other services the Air Force, on a percentage basis, has the highest concentration of women. In 1977 there were 570,470 officers and enlisted personnel in the Air Force and women composed 5.2% of the total force. By 1987 there were 607,035 officers and enlisted personnel in the Air Force and the proportion of women had increased from 5.2% to 12.6% of the total force.

The influx of women into the Air Force is a relatively recent phenomenon and in large part mirrors women's changing role in American society. There have been several historic and descriptive accounts of

women's participation in the military establishment but very few empirical studies.

With its large, hierarchical structure, the Air Force provides a highly complex and rarely studied organizational model from which to assess how women have fared in comparison to men in opportunities for advancement. The Air Force was also chosen for this study because this researcher is familiar with its organizational structure and policies and had access to its data bases.

Subjects

The sample studied was composed of all officers in the Air Force Nurse Corps (NC), Biomedical Sciences Corps (BSC), and Medical Service Corps (MSC) for the period between 1977 and 1987. Health professions is a collective term used by the Air Force to refer to these corps. The Medical Corps and Dental Corps were excluded from this study because officers in these groups compete for promotion under a different set of guidelines, receive enhanced compensation packages, and are exempted from the computation of grade ceilings for the active duty force. Hereafter, in this report, use of the term health professions will collectively refer to members in the Nurse Corps, Biomedical Sciences Corps, and Medical Service Corps.

Initially, each corps was classified as either male- or female-dominated if over 70 percent of all assigned officers were male or female. In 1987, 77 percent of officers in the Nurse Corps were female, 80 percent of officers in the Biomedical Sciences Corps were male, and 86 percent of officers in the Medical Service Corps were male. The following description of the health professions included in this study attests to the comparability of these groups: each corps consists of a

group of specialties of the same type (nursing, administration, or ancillary support) and within the same broad occupational grouping, health related professions. Each corps also spans all officer grades or ranks excluding general officer ranks, hence opportunity for advancement within each corps is possible from the lowest rank (second lieutenant) to the highest rank (colonel) during an individual's career. Although the Nurse Corps does have one brigadier general, this position was not included in the analysis herein due to the limited opportunity for advancement to this rank because of its singular status and because this position does not exist in other corps included in the study.

The Air Force defines a competitive category as "a group or category of officers who compete among themselves for promotion" (AFR 36-89, 1987). The total number of officers in each competitive category other than line of the Air Force (LAF) is relatively small and clearly reflects occupational grouping.

Data Sources and Methods

This section delineates all data sources and methods used to investigate each of the three research questions. Explanations of data sources and methods are provided in four subsections titled:

(a) opportunity for advancement, (b) retention rates, (c) rate of return to education, and (d) financial compensation.

Opportunity for Advancement

Unless specified otherwise, promotion rates used in the analysis are in-the-promotion zone (IPZ) rates and are expressed as the percentage of first time eligibles selected for promotion out of the total number

of IPZ eligibles considered. To assess an individual group member's opportunity for advancement, promotion rates to each competitive rank (captain to colonel) for each of the eleven years were secured from computerized files maintained by the Directorate of Personnel Program Management, Headquarters Air Force Military Personnel Center (HQ AFMPC), Randolph Air Force Base (AFB), Texas.

Since the Air Force is a closed personnel system, opportunity for promotion is directly dependent on the number of vacancies in each grade. Vacancies are created by the departure of individuals (either through promotion or resignation) and by creation of new positions. In the Air Force, management engineering teams establish manpower requirements for each work center and thereafter make periodic adjustments up or down in numbers or grade mix by validating need. Therefore, to compare the availability of opportunities for advancement within each of the corps, manpower data on validated officer grade mix requirements for each of the eleven years was obtained from the Directorate of Medical Plans and Resources, located in Headquarters, United States Air Force Office of the Surgeon General (HQ USAF SG), Bolling AFB, Washington, DC. The relative opportunity for male-dominated and female-dominated corps promotions were estimated by calculating proportions of officers in each rank against authorized strength for each corps. Comparisons were made on the proportion of lower-level (company grade) to upper-level (field grade) officers to determine if there were significant differences in rank levels between the corps. The data were first subjected to a time-series analysis using line graphs to highlight trends and patterns in promotion rates by corps for each competitive grade over the eleven years.

Comparisons were made for any observed differences in promotion rates between the corps by assessing the amount, strength, and stability of the difference over time.

Retention Rates

High opportunity for promotion with the associated increased earnings, recognition and responsibilities can attract an individual to an organization or entice an employee to remain. The relationship between these two variables (promotion rates and retention rates) was explored using data on retention obtained from HQ USAF SG. Cohort retention rates reflect the retention behavior of groups of officers by corps who ended their initial obligation in the same fiscal year. A gross comparative analysis was conducted on the raw percentage rates for cohort groups by corps for the year ending the initial obligation through five years beyond.

The final step in analysis of retention was to identify whether a relationship existed between promotion rates and retention. A bivariate regression analysis was conducted using promotion rates from 1979 - 1987 and cohort retention rates at completion of initial obligation from 1980 - 1988 (earlier data unavailable) for all three corps. Because this study used grouped data it was necessary to combine annual data from all three corps to increase the size of the n, resulting in $n = 27$, or 9 years of data for 3 groups.

By combining these annual retention rates for analysis, the implicit assumption was made that all officers, regardless of corps, would exhibit the same retention behavior response to changes in their promotion

opportunity arising from a rise or fall in promotion rates. A second assumption about retention behavior was also made. Since promotion selection boards do not meet at the same time for all competitive grades but instead are held at different times throughout the year, it was implicitly assumed in the regression analysis that once the year's promotion rates were published an individual's decision to remain in service would thus appear in the retention rates for the following year. Therefore, retention rates (REINNFY) in a given year used in the regression analysis were lagged by one year behind promotion rates.

Rate of Return on Education

One reason often given to explain differences in male-female overall career earnings is the difference in job levels held by males and females (Malkiel & Malkiel, 1973). Job levels or ranks in the Air Force have specific salary ranges associated with them, the higher the level an individual attains in the organization through promotion the higher the individual's salary range and overall career earnings will be. To explore the net effect of promotions on lifetime earnings for each corps, the 1987 basic compensation scale by rank and time-in-service was secured from the Air Force Accounting and Finance Center, Denver, Colorado.

Many workers take information about promotion prospects and the incremental earnings associated with progression up promotion ladders into account when making rational selections among organizations. Individuals are expected to align themselves with whichever organization can provide the maximum return on their investment. In addition to the data on pay and promotion rates previously mentioned, tuition costs for baccalaureate and masters degrees in nursing and business administration were obtained from the University of Florida Registrar to use in .

computing educational investment costs. Lost opportunity costs were measured using statistics reported by the U.S. Department of Commerce (1988) on the mean income earned by full-time workers by sex, age, and number of years of schooling completed.

Supporters of neoclassical economic theories believe that individuals exercise freedom of choice and behave rationally when choosing their occupations and attained job skill level. This human capital approach assumes that individuals choose an occupation fairly early in life and stay with it, particularly when they acquire specialized occupational training prior to employment (Harriman, 1985). Choice in the human capital model concerns the type and amount of investments an individual makes related to jobs or occupations. There are many types of human capital investments individuals can make but most of the research has focused on monetary returns related to training obtained in school, on-the-job, or from work experience.

While it seems logical to assume that an individual evaluates all alternatives available before making any investments in human capital, observing the natural processes an individual actually goes through in making an occupational choice would involve very lengthy and costly experimental studies. Therefore, a hypothetical example or scenario was created for this study to compare two alternative career paths which illustrate, from an economic perspective, the importance of occupational choice and promotion rates on lifetime earnings and retention rates at various career stages. Individuals seeking job security would be expected to self-select into organizations with career ladders that offer the most security and return on investment.

Human capital economists posit that education has a strong positive effect on the earnings of both men and women. In this approach the earnings gap between males and females is explained as a reflection of real differences in their human capital (education). According to Trieman and Roos (1983) if males and females can be shown to have different rates of return on their investments in education, the human capital hypothesis should be called into question because of gender discrimination.

The scenario developed for this study in which two high school graduates, one male and the other female, possessing perfect information compared their respective career choices using rates of return to investments in education as a measure follows. Class of 1987 high school graduates Nancy Nightingale and Adam Bookmaker have just discovered they are about to embark on similar career paths. Both students chose careers in health related professions, Nancy in nursing and Adam in hospital administration. Prompted by a strong sense of patriotism, both students also plan future careers in the Air Force. Armed with perfect career information and a knowledge of economics each student calculated their income horizons (Tables 4-5 & 4-6) by estimating expected costs and benefits over time from age 18 to age 65 using information gathered on current costs and compensation rates. Choice of a particular career path was weighed by comparing total expected lifetime earnings or benefits against expected total costs for education and foregone earlier employment opportunities. In this study rate of return, refers to net present value estimates and an estimate of the internal rate of return on investment.

In the study scenario, differences in initial levels of education obtained by Nancy and Adam reflect current Air Force entry level requirements of a baccalaureate degree for NC officers and a masters degree for MSC officers. Data obtained from the Air Force Medical Recruiting Service on officers accepted into the Nurse Corps and Medical Service Corps in 1988 show that 99.4% of new nurses had a baccalaureate degree and 76.4% of new MSC officers had a masters degree.

The number of credit hours currently required to obtain both a baccalaureate and masters degree in nursing and business administration were obtained from the University of Florida and used to determine tuition costs over each income horizon. Tuition costs were calculated to the nearest dollar using University of Florida 1987-88 out-of-state tuition rates for undergraduates of \$121.08 a credit hour for lower level courses and \$125.90 a credit hour for upper level courses and \$189.53 a credit hour for graduate courses. To simplify the analysis, it was assumed that the hypothetical scenario subjects, Adam and Nancy, both attended school full-time.

Opportunity costs for earnings foregone while in school were obtained for each year of schooling using Census Bureau statistics on the mean income for males ages 18-24 with 1-5 years of college for Adam and the mean income for females ages 18-24 with 1-4 years of college for Nancy. Additional tuition costs were calculated for Nancy to obtain a masters degree through night school at year 8 and 9 in the Air Force. This decision was based on the assumption that she would opt to increase her chances for promotion as reflected in Nurse Corps statistics showing 70 percent of nurses selected for lieutenant colonel in 1987 had a masters degree.

Financial Compensation

The center of financial compensation in the military is basic pay. Service members not provided meals and quarters on base receive supplemental allowances designed to defray the cost of obtaining food and housing on the private sector. Basic pay and allowances (without dependents rate) were used to calculate yearly incomes. Since basic military pay rates are tied to rank and years of service, separate yearly incomes (income A) had to be calculated for the sample subjects first using 1987 NC and MSC promotion rates and the 1987 basic compensation pay scale. Individual incomes were then proportionally adjusted (income B) by adding the results obtained from multiplying the IPZ rate of promotion to the next rank with the pay rate for that grade and multiplying the remaining percentage of those not promoted in the primary zone with the pay rate for the current grade for each year until the promotion rate reached 99 percent (based on adding the IPZ rate to the APZ rate annually). Hereafter income B is referred to as the opportunity income, that is, income B has been adjusted by 1987 estimated promotion opportunities.

The timing of promotion to the next grade was predetermined using current phase points and the year in which a 99 percent promotion rate was achieved. The timing of retirement in each case was based on current Air Force policy to selectively continue majors to retirement eligibility (20 years) and Defense Officer Personnel Management Act (DOPMA) guidelines of 30 years of service for colonels. Military retirement pay is set at 50 percent of basic pay for the appropriate grade in which the officer is retiring at 20 years and increases by 2.5 percent for each year of additional service up to a maximum of 75 percent. The study was

limited to an analysis of military earned income and does not account for additional income that could be earned from employment after retirement.

Since costs as well as earnings were distributed over time, expected costs as well as expected benefits had to be discounted to reflect the present value of a dollar for specific interest rates and time periods. This method accounted for the time value of money in the analysis. Tuition costs, opportunity costs, and income B were discounted each year at 3% and at 12% using discount factors for that year (for additional explanation see: Crowe, 1987). A 3% discount rate is considered a minimum acceptable discount rate which reflects the long-term real rate of growth of the United States economy. A 12% discount rate is considered to be the maximum acceptable discount rate and represents an approximation of current thirty year long-term treasury bond rates with a premium added for inflation. The total opportunity income after discounting is referred to as the opportunity adjusted income. Finally, undiscounted earnings taken from each income horizon were visually displayed in a line graph that depicted positive and negative earnings years over a time period of 47 years.

CHAPTER IV ANALYSIS AND PRESENTATION OF DATA

This chapter presents findings from the data analysis using the three research questions as a guide. The research questions for this study were:

1. Do officers in the Nurse Corps, a female-dominated group have lower promotion rates to field grade ranks than officers from the male-dominated Biomedical Sciences Corps or Medical Service Corps?
2. Do officers in the Nurse Corps have lower rates of return on investment for education than an officer in the Medical Service Corps?
3. Would a decrease in opportunity for promotion during the eleven year period be associated with a decrease in officer retention rates in the three corps studied?

Grouped data going back eleven years were available, permitting an analysis of trends in career mobility and retention for each of the three corps: Nurse Corps (NC), Biomedical Sciences Corps (BSC), and Medical Service Corps (MSC). Prior to 1977, data were not available for analysis in the form needed for this study owing to differences in collection procedures and limitations in computer technology in the mid 1970s. Correlations, line graphs, tables, bivariate regression, and rate of return on investment were the methods used to conduct the analysis.

Research Question One

After calculating the IPZ promotion percentage rates for each grade and corps for each year of the study period, comparisons were made using

descriptive statistics, line graphs, and estimations of overall promotion opportunity. Findings from the analysis did indicate that the female-dominated group, Nurse Corps (NC), did have lower promotion rates to field grade ranks than both of the male-dominated groups, Biomedical Sciences Corps (BSC) and Medical Service Corps (MSC). The analysis revealed consistently higher MSC promotion rates in each competitive grade category during the eleven year period analyzed. At the lowest field grade rank (Major/04) the male-dominated BSC, had several years of lower promotion rates than the female-dominated NC. However, at the two highest ranks (Lieutenant Colonel/05 and Colonel/06) the BSC promotion rates followed essentially the same pattern as the MSC group. At the Lieutenant Colonel and Colonel ranks greater differences in promotion rates between the male-dominated and female-dominated groups was obvious and remained fairly constant.

Reading from the left, Table 4-1 gives the year of the promotion selection board and the percentage of officers within each corps promoted in the primary zone at each competitive rank; Captain (03), Major (04), Lieutenant Colonel (05), and Colonel (06). Although Captain is a company grade rank, promotion to Captain is the start of the competitive process and therefore, was included in the table. However, the focus of this research hypothesis was solely on promotion rates to field grade ranks (04, 05, and 06). No promotion board was held for promotion to Major in 1977 and two boards were held for Major in 1986. Two promotion boards to Captain were held for each of the eleven years analyzed. For those double board years promotion percentage rates had to be adjusted due to disproportionate promotion groups by a weighting process to determine the best estimate of overall population values (Polit & Hungler, 1987).

Table 4-1

Promotion Percentage Rates by Corps and Grade 1977-1987

	NC				MSC				BSC			
	03	04	05	06	03	04	05	06	03	04	05	06
1977	.94	NB	.44	.23	.94	NB	.57	.45	.93	NB	.52	.40
N =	474		100	26	96		37	22	112		21	20
1978	.96	.56	.36	.20	.97	.64	.68	.55	.97	.69	.59	.35
N =	528	107	74	30	117	36	25	11	82	62	22	17
1979	.96	.63	.34	.18	.99	.76	.68	.36	.98	.71	.67	.38
N =	555	115	58	38	119	54	38	11	194	70	27	21
1980	.98	.66	.45	.31	.97	.78	.71	.50	.99	.80	.55	.43
N =	516	89	56	26	76	32	41	14	148	85	33	14
1981	.97	.78	.50	.26	1.00	.82	.60	.52	.99	.74	.64	.36
N =	497	167	152	47	84	33	30	21	151	103	84	25
1982	.93	.75	.45	.24	.98	.75	.62	.52	.95	.63	.59	.32
N =	556	159	71	37	85	36	29	21	138	83	59	19
1983	.90	.75	.49	.35	.94	.76	.72	.64	.92	.69	.57	.57
N =	459	147	85	26	107	50	47	14	116	101	69	14
1984	.92	.81	.34	.39	.89	.87	.63	.67	.91	.64	.43	.48
N =	188	152	70	18	64	63	27	27	83	84	68	23
1985	.96	.81	.45	.37	.94	.80	.69	.65	.92	.60	.48	.55
N =	163	195	140	19	121	51	29	26	137	122	79	20
1986	.97	.79	.41	.40	.94	.86	.72	.57	.95	.71	.39	.46
N =	328	464	128	72	64	108	29	23	128	278	64	55
1987	.97	.69	.34	.31	.99	.82	.70	.62	.93	.68	.48	.59
N =	423	249	113	35	72	69	44	21	110	113	75	32
Total												
N =	4687	1844	1047	374	1005	532	376	211	1399	1101	601	206

Note: NB means no promotion board was held that year.

Weighted averages were calculated using the following simple equation:

$$\frac{(n_1 \times r_1) + (n_2 \times r_2)}{n_1 + n_2}$$

where n = the total number of IPZ eligibles by corps for each promotion board and r = the promotion percentage rate by corps for each board.

Overall, the promotion percentage rates in each corps at the lowest grade category, Captain, occurred at approximately the same high rate during the period examined. However, promotion rates to field grade ranks for each of the three corps studied showed varying degrees of a downward shift to lower promotion percentage rates.

Line graphs were plotted displaying promotion percentage rates from Table 4-1 for all three corps, to provide a visual comparison of rates between the corps for each grade. Captain promotion percentage rates from 1977-1987 are displayed in the graph in Figure 4-1 showing the similarity and constancy in promotion rates for each corps.

The graph in Figure 4-2 of the Major promotion percentages rates from 1977-1987 shows that as the corps members advance up to this next hierarchical level (04) they begin a marked downward movement to lower promotion percentage rates. The graph illustrates that all corps follow the rate pattern established in the early years with both male-dominated corps displaying higher rates than NC. However, in 1981 the promotion rates to Major for the BSC group dropped sharply, remaining lower than NC rates until 1988 (not shown) when they again returned to their earlier pattern with rates of: 62% (NC), 72% (BSC), and 87% (MSC).

The graph in Figure 4-3 of Lieutenant Colonel promotion percentage rates from 1977-1987 shows a change in the pattern of promotion rates that occurred at the Major level, when BSC had several years of lower

CAPTAIN

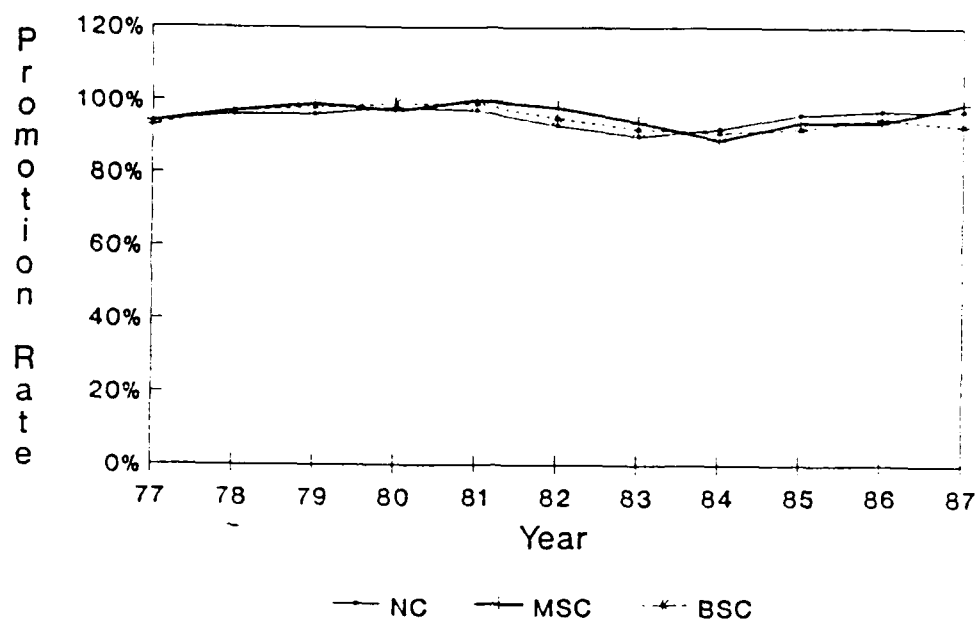


Figure 4-1

Promotion Rates to Captain by Corps 1977-1987

MAJOR

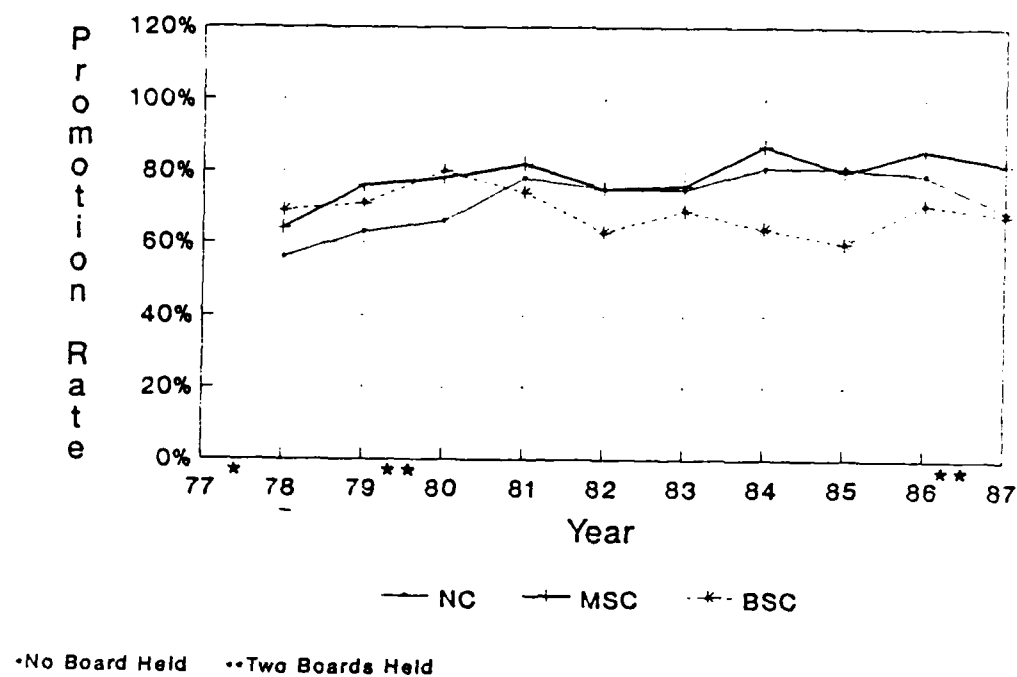


Figure 4-2

Promotion Rates to Major by Corps 1978-1987

LT. COLONEL

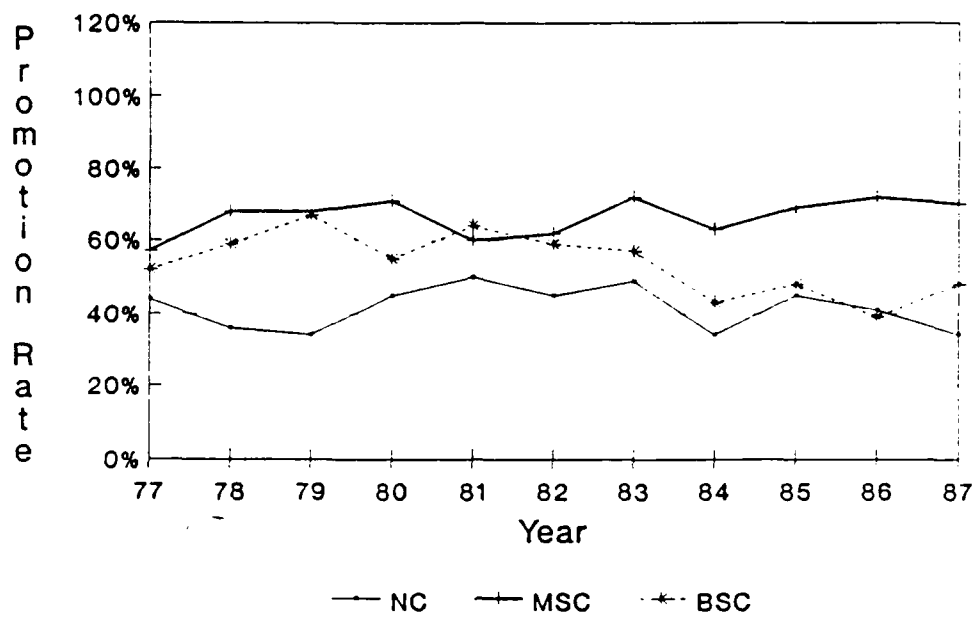


Figure 4-3

Promotion Rates to Lt. Colonel by Corps 1977-1987

rates than NC, to a pattern occurring at the 05 level where BSC and MSC both have higher promotion rates than NC throughout the eleven year period. Also visually depicted in this graph is the dramatic widening in the promotion gap between NC and MSC and to a lesser degree between NC and BSC.

The promotion pattern graphed in Figure 4-4, Colonel promotion percentage rates from 1977-1987, shows that NC promotion rates remained lower than MSC or BSC promotion rates throughout the study period. In this graph BSC promotion rates changed slightly from the 05 pattern which showed BSC rates were closer to NC rates than MSC rates in the last several years of the study period. Greater uncertainty in opportunity for NC and BSC officers than for MSC officers can also be seen in the fluctuating pattern of promotion rates graphed at this grade level.

An examination of promotion percentage rates calculated for each competitive grade for each corps from 1977 through 1987 can be seen in Table 4-2. The descriptive statistics listed in Table 4-2 provide measures of central tendency and dispersion, revealing the typical characteristics of promotion percentage rates for each grade by corps over the study period. The mean, median, range, standard deviation, and coefficient of variation are provided. The mean for each rank, from Captain through Colonel, reflects the average promotion percentage rate to that grade experienced within each corps during the eleven year period. The median shows the middle value for each corps' set of promotion rates, in other words, that value which divides those rates into two equal parts. The range indicates for each corps the distance in percentage points between the lowest and highest promotion rates for

COLONEL

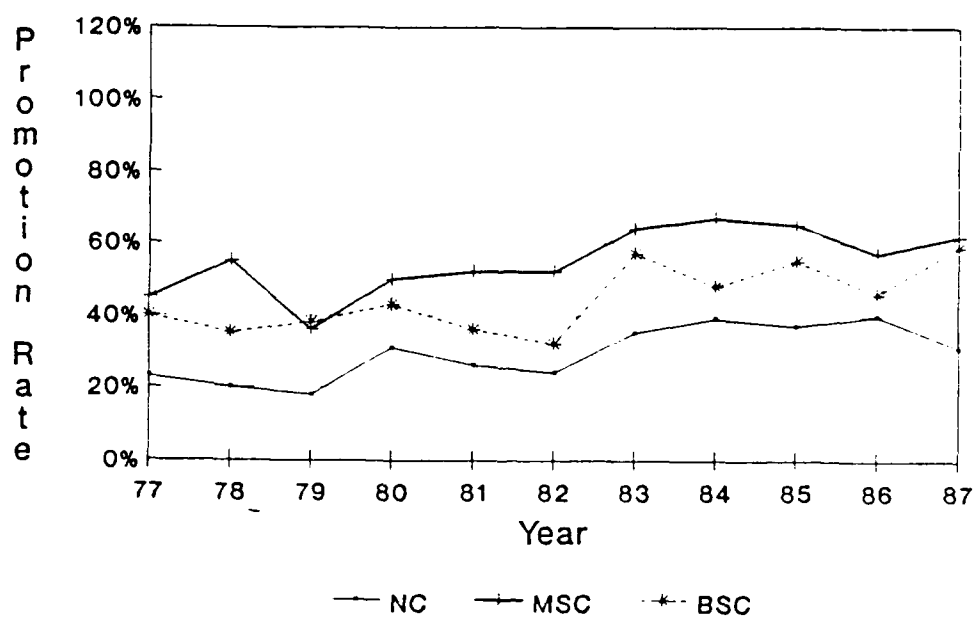


Figure 4-4

Promotion Rates to Colonel by Corps 1977-1987

Table 4-2

Comparison of Promotions by Corps and by Rank from 1977-1987**COLONEL (06)**

Corps	Mean	Median	Range	St. dev.	Coeff. var.
NC (N = 374)	29.45	31	22	7.38	25.00
MSC (N = 211)	55.00	55	31	8.95	16.20
BSC (N = 260)	44.45	43	27	8.04	13.96

LIEUTENANT COLONEL (05)

	Mean	Median	Range	St. dev.	Coeff. var.
NC (N = 1047)	41.54	44	16	5.80	13.96
MSC (N = 376)	66.55	68	15	4.94	7.42
BSC (N = 601)	53.72	55	28	8.26	15.38

MAJOR (04)

	Mean	Median	Range	St. dev.	Coeff. var.
NC (N = 1844)	72.00	75	25	8.04	11.17
MSC (N = 532)	78.60	79	23	6.25	7.95
BSC (N = 1101)	68.90	69	20	5.45	7.91

CAPTAIN (03)

	Mean	Median	Range	St. dev.	Coeff. var.
NC (N = 4687)	95.00	96	8	2.39	2.52
MSC (N = 1005)	95.90	97	11	3.09	3.22
BSC (N = 1399)	94.90	95	8	2.81	2.96

each grade level that occurred during the study period. The standard deviation shows the degree to which the promotion rates within each corps deviated from the mean rate over the eleven year period. The final statistic measured, the coefficient of variation, permitting a comparison of the relative variation in promotion rates that occurred between the corps at each competitive grade level.

Captain. Descriptive statistics, characterizing each corps promotion percentage rates by grade for the period 1977-1987 are provided in Table 4-2. Starting at the bottom of Table 4-2, calculations for the lowest rank Captain (03) show promotion opportunity at this grade to be high for all three corps with means of 95.00 (NC), 94.90 (BSC), and 95.90 (MSC). The range shows the relatively small difference in promotion rates that occurred within each corps during this period. A difference of only 8 percentage points separating the highest from the lowest promotion rate occurred for both NC and BSC and an 11 percentage point difference in rates occurred for MSC. The low coefficients of variation, 2.52 (NC), 2.96 (BSC), and 3.22 (MSC) also reflect the stability in promotion rates at the captain level over the eleven years studied.

Major. At the next grade level, Major (04), the mean: 72.00 (NC), 68.90 (BSC), and 73.60 (MSC) show the lower promotion rates experienced by BSC for 7 out of eleven years under study. Greater fluctuation in the promotion rates were seen at this first level in the field grade ranks by the higher range in promotion percentages of 25 (NC), 23 (MSC), and 20 (BSC). A greater variation in rates for NC at the Major level over the eleven year period was reflected in a coefficient of variation of 11.17,

smaller coefficients of variation were seen in the male-dominated corps BSC, 7.91 and MSC, 7.95.

Lieutenant Colonel. A comparison of the descriptive statistics calculated for the two highest ranks (Lieutenant Colonel and Colonel) reflected a marked difference between the male-dominated and female-dominated corps promotion rates. At the lieutenant colonel level the means illustrate the lower promotion rates experienced by NC with a mean of 41.54 compared to a mean of 53.72 for BSC and 66.55 for MSC. Variation in promotion rates between the corps was seen in the coefficients of variation, BSC and NC experienced considerable variation at 13.96 (NC) and 15.38 (BSC), while MSC had a much lower coefficient of variation at 7.42. In fact, this coefficient of variation was slightly lower than the 7.95 experienced by majors in the MSC.

Colonel. The greatest difference between the male-dominated and female-dominated corps was seen in comparisons made at Colonel (O6), the highest rank. The downward shift to lower promotion rates for NC was clearly reflected in the means: 29.45 (NC), 44.45 (BSC), and 55.00 (MSC). A greater level of uncertainty occurs for NC officers as seen by the larger coefficient of variation, 25.00 compared to those for male-dominated corps of, 16.20 (MSC) and 11.20 (BSC).

Opportunity for promotion. Another picture of the dissimilarity between the corps in promotion rates is provided in Table 4-3 which gives overall promotion opportunity from First Lieutenant to Colonel by corps for each year between 1978 and 1987. Overall promotion opportunities were calculated by multiplying each corps' promotion rates for each competitive grade for each year of the study period. The result of each year's calculation multiplied by 1,000 gave the number of officers for

Table 4-3

Overall Promotion Opportunity from Lieutenant to Colonel by
Corps for each Year Between 1978-1987

Year	Corps		
	NC	MSC	BSC
1978	39	232	138
1979	37	184	177
1980	90	269	187
1981	98	256	169
1982	75	237	113
1983	116	329	206
1984	99	327	120
1985	129	337	146
1986	126	332	121
1987	70	352	140

Note: Overall opportunity for promotion is expressed as the number of officers out of 1000 that could expect to be promoted from Lieutenant to Colonel based on that year's promotion rates.

every 1,000 officers in that corps that could expect to be promoted from First Lieutenant to Colonel given that corps' promotion rates for that year. In only one year (1986) and by a slim margin of only five officers does the NC, the female-dominated group exceed one of the male-dominated groups (BSC). In 1986, 126 NC officers in 1,000 would have been promoted versus 121 BSC officers in every 1,000. In every other year, figures for both male-dominated groups, MSC and BSC, greatly exceed those for the female-dominated NC.

Since opportunity for promotion during this period was directly dependent on Air Force structural policies, specifically, established officer grade structures for each corps, a proportional comparison was made of size and grade ratios for each corps calculated by year from validated grade requirements. An examination of these calculations in Table 4-4 shows the marked differences that existed in grade and size ratios between the corps. Table 4-4 lists the total number of validated officer requirements for each corps by year, and provides a breakdown of the grade structure for each corps showing the percentage of: upper level (lieutenant colonel and colonel), middle level (captain and major), lower level (2nd lieutenant and 1st lieutenant), field grade (major, lieutenant colonel, and colonel) and company grade (2nd lieutenant, 1st lieutenant, and captain) officers in relation to each corps size. The comparison of grade levels and grade ratios by corps that were calculated from validated grade requirements. Table 4-4 also compares size and grade ratios between MSC:NC and BSC:NC. These grade ratios were calculated by taking ratios of the percentage of officers in that grade in those corps rounded to the nearest whole number.

Table 4-4

Comparison of Grade Levels and Grade Ratios by Corps 1977-1987

	1977					
	MSC		MSC:NC [ratio]		BSC:NC [ratio]	
	990		3634		1521	
Total #	270	27%	122	3%	144	9%
Upper (05/06)	642	65%	2126	59%	1126	74%
Middle (03/04)	78	6%	1386	38%	251	17%
Lower (01/02)	469	47%	409	11%	344	23%
Field Grade	521	53%	3225	89%	1177	77%
Company Grade						

	1978					
	MSC		MSC:NC [ratio]		BSC:NC [ratio]	
	952		3738		1702	
Total #	256	27%	159	4%	165	10%
Upper (05/06)	599	63%	2296	61%	1196	70%
Middle (03/04)	97	10%	1283	34%	341	20%
Lower (01/02)	463	49%	548	15%	361	21%
Field Grade	489	51%	3190	85%	1341	79%
Company Grade						

Table 4-4--continued

1979						
	MSC		MSC:NC [ratio]		BSC:NC [ratio]	
	MSC	NC	MSC:NC [ratio]	NC	BSC:NC [ratio]	BSC
Total #	971	3751	1:4	3751	1:2	1848
Upper (05/06)	257	178	5:1	178	2:1	190
Middle (03/04)	555	2046	1:1	2046	1:1	1181
Lower (01/02)	159	1527	1:3	1527	1:2	477
Field Grade	466	714	3:1	714	1:1	442
Company Grade	505	3037	1:2	3037	1:1	1406
1980						
	MSC		MSC:NC [ratio]		BSC:NC [ratio]	
	MSC	NC	MSC:NC [ratio]	NC	BSC:NC [ratio]	BSC
Total #	1185	3738	1:4	3738	1:2	1702
Upper (05/06)	259	231	6:1	231	2:1	188
Middle (03/04)	783	3576	1:1	3576	1:1	1657
Lower (01/02)	143	1349	1:2	1349	1:1	451
Field Grade	492	805	3:1	805	1:1	454
Company Grade	693	4351	1:1	4351	1:1	1842
1981						
	MSC		MSC:NC [ratio]		BSC:NC [ratio]	
	MSC	NC	MSC:NC [ratio]	NC	BSC:NC [ratio]	BSC
Total #	1224	5153	1:4	5153	1:2	2330
Upper (05/06)	301	294	4:1	294	2:1	271
Middle (03/04)	771	3312	1:1	3312	1:1	1609
Lower (01/02)	152	1547	1:3	1547	1:2	450
Field Grade	539	1160	2:1	1160	1:1	685
Company Grade	685	3993	1:1	3993	1:1	1645

Table 4-4--continued

	1982					
	MSC		MSC:NC [ratio]		BSC:NC [ratio]	
	MSC	NC	MSC:NC [ratio]	NC	BSC:NC [ratio]	BSC
Total #	1304	6144	1:5	6144	1:2	2679
Upper (05/06)	314	312	5:1	312	2:1	290
Middle (03/04)	821	3523	1:1	3523	1:1	1603
Lower (01/02)	169	2309	1:3	2309	1:1	786
Field Grade	586	1177	2:1	1177	1:1	594
Company Grade	718	4967	1:2	4967	1:1	2085
	1983					
	MSC		MSC:NC [ratio]		BSC:NC [ratio]	
	MSC	NC	MSC:NC [ratio]	NC	BSC:NC [ratio]	BSC
Total #	1470	6819	1:5	6819	1:3	2759
Upper (05/06)	335	324	5:1	324	2:1	314
Middle (03/04)	836	3594	1:1	3594	1:1	1628
Lower (01/02)	299	2901	1:2	2901	1:1	817
Field Grade	699	1313	3:1	1313	1:1	721
Company Grade	771	5506	1:2	5506	1:1	2038
	1984					
	MSC		MSC:NC [ratio]		BSC:NC [ratio]	
	MSC	NC	MSC:NC [ratio]	NC	BSC:NC [ratio]	BSC
Total #	1354	6149	1:5	6149	1:3	2484
Upper (05/06)	338	304	5:1	304	2:1	305
Middle (03/04)	816	3387	1:1	3387	1:1	517
Lower (01/02)	200	2458	1:3	2458	1:2	662
Field Grade	701	1244	3:1	1244	1:1	706
Company Grade	653	4905	1:2	4905	1:1	1778

Table 4-4--continued

	1985					
	MSC		MSC:NC [ratio]		BSC:NC [ratio]	
	MSC	NC	MSC:NC [ratio]	NC	BSC:NC [ratio]	BSC
Total #	1429	6841	1:5	6841	1:3	2695
Upper (05/06)	354	25%	5:1	349	3:1	364
Middle (03/04)	904	63%	1:1	4098	1:1	1722
Lower (01/02)	171	12%	1:3	2394	1:2	609
Field Grade	723	51%	2:1	1468	2:1	926
Company Grade	706	49%	1:2	5373	1:1	1769
	1986					
	MSC		MSC:NC [ratio]		BSC:NC [ratio]	
	MSC	NC	MSC:NC [ratio]	NC	BSC:NC [ratio]	BSC
Total #	1425	6051	1:4	6051	1:2	2705
Upper (05/06)	360	25%	4:1	337	2:1	371
Middle (03/04)	900	62%	1:1	3736	1:1	1856
Lower (01/02)	165	12%	1:3	1978	1:2	478
Field Grade	727	51%	2:1	1365	2:1	1058
Company Grade	698	49%	1:2	4686	1:1	1647
	1987					
	MSC		MSC:NC [ratio]		BSC:NC [ratio]	
	MSC	NC	MSC:NC [ratio]	NC	BSC:NC [ratio]	BSC
Total #	1508	6422	1:4	6422	1:2	2893
Upper (05/06)	398	26%	4:1	428	2:1	397
Middle (03/04)	961	64%	1:1	3954	1:1	1974
Lower (01/02)	149	10%	1:3	2039	1:2	521
Field Grade	792	53%	2:1	1568	2:1	1163
Company Grade	716	47%	1:2	4853	1:1	1729

Table 4-4 reveals a pattern of promotions by validated grade requirements consistent with much higher promotion rates in the male-dominated corps, MSC and BSC. The female-dominated NC had a much lower percentage of officers validated in grades at the upper level or field grade levels in proportion to the total number of NC officers. Calculated grade and size ratios comparing MSC:NC and BSC:NC showed this difference remained constant throughout the study period.

A reason for this difference in grade ratios is easily seen when field grade (major, lieutenant colonel, and colonel) and company grade (2nd lieutenant, 1st lieutenant, and captain) ratios are broken down into upper (lieutenant colonel and colonel), middle (captain and major), and lower (2nd lieutenant and 1st lieutenant) hierarchical levels. Both male- and female-dominated groups had a consistent 1:1 ratio at the middle grade level throughout the 11 year period analyzed. The real difference in grade ratios throughout this period can be seen in the upper and lower grade levels. In the first two years of the study period the BSC:NC lower level ratios were 1:2 and 1:3 then in 1979 the ratios changed to 1:1 until 1984 when the ratios again returned to 1:2 for the remaining four years. The BSC:NC upper level ratios remained relatively constant at 2:1 throughout this same period. Lower and upper grade level ratios for MSC:NC also remained relatively constant at 1:3 and 5:1 respectively.

Research Question Two

The findings of this study did not support research question two of the study. In comparing total earnings to total costs, the hypothetical nurse experienced a greater return on total investment than the hypothetical administrator as well as a better internal rate of return.

However, further reflection suggests that the income horizons calculated hid some career costs which might be incorporated in future analyses.

Tables 4-5 (Adam Bookmaker-Income Horizon) and 4-6 (Nancy Nightingale-Income Horizon) display the amount and timing of career earnings, investments, and promotions for two hypothetical officers, one in the Nurse Corps and one in the Medical Service Corps. An MSC officer was chosen for the analysis because of the comparative similarity in occupational composition between the corps, with both groups more homogenous than BSC and because of the greater disparity in promotion rates found between MSC and NC. Basic pay rates and promotion rates for 1987 for each corps were used to calculate timing of promotions and salaries.

Although total adjusted earnings (income B) for Nancy Nightingale are considerably less than total adjusted earnings for Adam Bookmaker, the gap narrows and then reverses itself once the earnings are discounted at 3% and then at 12%. This gap in earning is initially \$470,314 and when discounted at 3% drops by slightly more than half the initial amount to \$216,604, both figures in favor of Adam Bookmaker. However, when both earnings are discounted at 12% Nancy Nightingale's earnings surpass Adam Bookmaker's by \$11,830. Total costs for education (see tuition) are essentially the same with only \$2,022 more being spent by Adam Bookmaker. Yet, there is a noticeable difference in opportunity lost income with Adam Bookmaker experiencing a \$53,293 investment cost in excess of that experienced by Nancy Nightingale.

The next column for the scenario shows the rank and year of Air Force service reflecting the difference in promotion rates for each corps. Dissimilarities can be seen in the time it takes for each

Table 4-5

Adam Bookmaker Income Horizon

Year/Age	Tuition	Lost Income	Total	AF Rank/Year	Income A	Promo %
1/18	\$3,632.40	\$14,159.00	\$17,791.00	NA	NA	NA
2/19	\$3,632.40	\$15,633.00	\$19,265.00	NA	NA	NA
3/20	\$4,031.04	\$15,633.00	\$19,664.00	NA	NA	NA
4/21	\$4,031.04	\$15,633.00	\$19,664.00	NA	NA	NA
5/22	\$5,401.61	\$20,678.00	\$26,080.00	NA	NA	NA
6/23	\$5,401.61	\$20,678.00	\$26,080.00	NA	NA	NA
7/24	\$0.00	\$0.00	\$0.00	1Lt/0-1	\$22,325.00	NA
8/25	\$0.00	\$0.00	\$0.00	1Lt/1-2	\$22,325.00	NA
9/26	\$0.00	\$0.00	\$0.00	Capt/2-3	\$27,819.00	99%
10/27	\$0.00	\$0.00	\$0.00	Capt/3-4	\$29,641.00	NA
11/28	\$0.00	\$0.00	\$0.00	Capt/4-5	\$32,186.00	NA
12/29	\$0.00	\$0.00	\$0.00	Capt/5-6	\$32,186.00	NA
13/30	\$0.00	\$0.00	\$0.00	Capt/6-7	\$33,449.00	NA
14/31	\$0.00	\$0.00	\$0.00	Capt/7-8	\$33,449.00	NA
15/32	\$0.00	\$0.00	\$0.00	Capt/8-9	\$34,447.00	NA
16/33	\$0.00	\$0.00	\$0.00	Capt/9-10	\$34,447.00	82%
17/34	\$0.00	\$0.00	\$0.00	Maj/10-11	\$38,525.00	30%
18/35	\$0.00	\$0.00	\$0.00	Maj/11-12	\$38,525.00	NA
19/36	\$0.00	\$0.00	\$0.00	Maj/12-13	\$40,311.00	NA
20/37	\$0.00	\$0.00	\$0.00	Maj/13-14	\$40,311.00	NA
21/38	\$0.00	\$0.00	\$0.00	Maj/14-15	\$41,841.00	70%
22/39	\$0.00	\$0.00	\$0.00	Maj/15-16	\$41,841.00	15%
23/40	\$0.00	\$0.00	\$0.00	LtCol/16-17	\$47,165.00	NA
24/41	\$0.00	\$0.00	\$0.00	LtCol/17-18	\$47,165.00	NA
25/42	\$0.00	\$0.00	\$0.00	LtCol/18-19	\$49,455.00	NA
26/43	\$0.00	\$0.00	\$0.00	LtCol/19-20	\$49,455.00	62%
27/44	\$0.00	\$0.00	\$0.00	LtCol/20-21	\$50,733.00	13%
28/45	\$0.00	\$0.00	\$0.00	LtCol/21-22	\$50,733.00	13%
29/46	\$0.00	\$0.00	\$0.00	Col/22-23	\$58,451.00	NA
30/47	\$0.00	\$0.00	\$0.00	Col/23-24	\$58,451.00	NA
31/48	\$0.00	\$0.00	\$0.00	Col/24-25	\$58,451.00	NA
32/49	\$0.00	\$0.00	\$0.00	Col/25-26	\$58,451.00	NA
33/50	\$0.00	\$0.00	\$0.00	Col/26-27	\$62,750.00	NA
34/51	\$0.00	\$0.00	\$0.00	Col/27-28	\$62,750.00	NA
35/52	\$0.00	\$0.00	\$0.00	Col/28-29	\$62,750.00	NA
36/53	\$0.00	\$0.00	\$0.00	Col/29-30	\$62,750.00	NA
37/54	\$0.00	\$0.00	\$0.00	Retirement	\$41,340.00	NA
38/55	\$0.00	\$0.00	\$0.00	Retirement	\$41,340.00	NA
39/56	\$0.00	\$0.00	\$0.00	Retirement	\$41,340.00	NA
40/57	\$0.00	\$0.00	\$0.00	Retirement	\$41,340.00	NA
41/58	\$0.00	\$0.00	\$0.00	Retirement	\$41,340.00	NA
42/59	\$0.00	\$0.00	\$0.00	Retirement	\$41,340.00	NA
43/60	\$0.00	\$0.00	\$0.00	Retirement	\$41,340.00	NA
44/61	\$0.00	\$0.00	\$0.00	Retirement	\$41,340.00	NA
45/62	\$0.00	\$0.00	\$0.00	Retirement	\$41,340.00	NA
46/63	\$0.00	\$0.00	\$0.00	Retirement	\$41,340.00	NA
47/64	\$0.00	\$0.00	\$0.00	Retirement	\$41,340.00	NA
48/65	\$0.00	\$0.00	\$0.00	Retirement	\$41,340.00	NA
TOTAL	\$26,130.00	\$102,414.00	\$128,544.00		\$1,819,218.00	

Table 4-5--continued

Year/Age	Income B	3% Discount	12% Discount	3% Total Costs	12% Total Costs
1/18	NA	NA	NA	\$17,273.00	\$15,886.00
2/19	NA	NA	NA	\$18,159.00	\$15,358.00
3/20	NA	NA	NA	\$17,995.00	\$13,977.00
4/21	NA	NA	NA	\$17,471.00	\$12,496.00
5/22	NA	NA	NA	\$22,497.00	\$14,798.00
6/23	NA	NA	NA	\$21,764.00	\$13,212.00
7/24	\$22,325.00	\$18,152.00	\$10,098.00		
8/25	\$22,325.00	\$17,623.00	\$9,017.00		
9/26	\$27,764.00	\$21,278.00	\$10,012.00		
10/27	\$29,641.00	\$22,056.00	\$8,544.00		
11/28	\$32,186.00	\$23,251.00	\$9,253.00		
12/29	\$32,186.00	\$22,575.00	\$8,262.00		
13/30	\$33,449.00	\$22,779.00	\$7,667.00		
14/31	\$33,449.00	\$22,113.00	\$6,844.00		
15/32	\$34,447.00	\$22,112.00	\$6,293.00		
16/33	\$36,129.00	\$22,516.00	\$5,893.00		
17/34	\$38,525.00	\$23,308.00	\$5,609.00		
18/35	\$38,525.00	\$22,630.00	\$5,008.00		
19/36	\$40,311.00	\$22,990.00	\$4,680.00		
20/37	\$40,311.00	\$22,320.00	\$4,180.00		
21/38	\$43,625.00	\$23,448.00	\$4,040.00		
22/39	\$44,007.00	\$22,967.00	\$3,635.00		
23/40	\$47,165.00	\$23,890.00	\$3,471.00		
24/41	\$47,165.00	\$23,200.00	\$3,108.00		
25/42	\$49,455.00	\$23,620.00	\$2,908.00		
26/43	\$52,671.00	\$24,424.00	\$2,765.00		
27/44	\$54,432.00	\$24,505.00	\$2,553.00		
28/45	\$55,073.00	\$24,794.00	\$2,308.00		
29/46	\$58,451.00	\$24,800.00	\$2,186.00		
30/47	\$58,451.00	\$24,082.00	\$1,952.00		
31/48	\$58,451.00	\$23,380.00	\$1,742.00		
32/49	\$58,451.00	\$22,699.00	\$1,555.00		
33/50	\$62,750.00	\$23,658.00	\$1,491.00		
34/51	\$62,750.00	\$22,969.00	\$1,331.00		
35/52	\$62,750.00	\$22,301.00	\$1,186.00		
36/53	\$62,750.00	\$21,651.00	\$1,061.00		
37/54	\$41,340.00	\$13,848.00	\$624.00		
38/55	\$41,340.00	\$13,445.00	\$557.00		
39/56	\$41,340.00	\$13,053.00	\$498.00		
40/57	\$41,340.00	\$12,675.00	\$442.00		
41/58	\$41,340.00	\$12,304.00	\$397.00		
42/59	\$41,340.00	\$11,946.00	\$354.00		
43/60	\$41,340.00	\$11,598.00	\$316.00		
44/61	\$41,340.00	\$11,260.00	\$282.00		
45/62	\$41,340.00	\$10,930.00	\$252.00		
46/63	\$41,340.00	\$10,613.00	\$225.00		
47/64	\$41,340.00	\$10,304.00	\$201.00		
48/65	\$41,340.00	\$10,004.00	\$179.00		
TOTAL	\$1,629,350.00	\$824,071.00	\$142,979.00	\$115,159.00	\$85,747.00

Table 4-6

Nancy Nightingale Income Horizon

Year/Age	Tuition	Lost Income	Total	AF Rank/Year	Income A	Promo %
1/18	\$3,875.00	\$11,480.00	\$15,355.00	0	NA	NA
2/19	\$3,875.00	\$12,547.00	\$16,422.00	0	NA	NA
3/20	\$3,632.00	\$12,547.00	\$16,179.00	0	NA	NA
4/21	\$3,632.00	\$12,547.00	\$16,179.00	0	\$0.00	NA
5/22	\$0.00	\$0.00	\$0.00	2L0-1	\$19,521.00	NA
6/23	\$0.00	\$0.00	\$0.00	2L1-2	\$19,521.00	NA
7/24	\$0.00	\$0.00	\$0.00	1L2-3	\$23,931.00	100%
8/25	\$0.00	\$0.00	\$0.00	1L3-4	\$27,761.00	NA
9/26	\$0.00	\$0.00	\$0.00	1L4-5	\$28,532.00	97%
10/27	\$0.00	\$0.00	\$0.00	Cp5-6	\$32,186.00	33%
11/28	\$0.00	\$0.00	\$0.00	Cp6-7	\$33,449.00	NA
12/29	\$4,549.00	\$0.00	\$4,549.00	Cp7-8	\$33,449.00	NA
13/30	\$4,549.00	\$0.00	\$4,545.00	Cp8-9	\$34,447.00	NA
14/31	\$0.00	\$0.00	\$0.00	Cp9-10	\$34,447.00	NA
15/32	\$0.00	\$0.00	\$0.00	Cpl0-11	\$35,998.00	NA
16/33	\$0.00	\$0.00	\$0.00	Cpl1-12	\$35,998.00	69%
17/34	\$0.00	\$0.00	\$0.00	Cpl2-13	\$37,492.00	15%
18/35	\$0.00	\$0.00	\$0.00	Mjl3-14	\$40,311.00	15%
19/36	\$0.00	\$0.00	\$0.00	Mjl4-15	\$41,841.00	NA
20/37	\$0.00	\$0.00	\$0.00	Mjl5-16	\$41,841.00	NA
21/38	\$0.00	\$0.00	\$0.00	Mjl6-17	\$43,378.00	NA
22/39	\$0.00	\$0.00	\$0.00	Mjl7-18	\$43,378.00	NA
23/40	\$0.00	\$0.00	\$0.00	Mjl8-19	\$44,390.00	34%
24/41	\$0.00	\$0.00	\$0.00	Mjl9-20	\$44,390.00	8%
25/42	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
26/43	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	62%
27/44	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	13%
28/45	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	13%
29/46	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
30/47	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
31/48	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
32/49	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
33/50	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
34/51	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
35/52	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
36/53	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
37/54	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
38/55	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
39/56	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
40/57	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
41/58	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
42/59	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
43/60	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
44/61	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
45/62	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
46/63	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
47/64	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
48/65	\$0.00	\$0.00	\$0.00	Retire	\$18,803.00	NA
TOTAL	\$24,108.00	\$49,121.00	\$73,229.00		\$1,147,533.00	

Table 4-6---continued

Year/Age	Income B	3% Discount	12% Discount	3% Total Costs	12% Total Costs
1/18		NA	NA	\$14,908.00	\$13,311.00
2/19		NA	NA	\$15,479.00	\$12,340.00
3/20		NA	NA	\$14,805.00	\$11,516.00
4/21		NA	NA	\$14,357.00	\$10,282.00
5/22	\$19,521.00	\$16,839.	\$11,076.00		
6/23	\$19,521.00	\$16,349.	\$9,889.00		
7/24	\$23,931.00	\$19,458.00	\$10,824.00		
8/25	\$27,761.00	\$21,915.00	\$11,213.00		
9/26	\$32,076.00	\$24,583.00	\$11,567.00		
10/27	\$32,186.00	\$23,950.00	\$10,364.00		
11/28	\$33,449.00	\$24,164.00	\$9,617.00		
12/29	\$33,449.00	\$23,461.00	\$8,586.00	\$3,191.00	\$1,168.00
13/30	\$34,447.00	\$23,458.00	\$7,895.00	\$3,095.00	\$1,042.00
14/31	\$34,447.00	\$22,773.00	\$7,048.00		
15/32	\$35,998.00	\$23,107.00	\$6,577.00		
16/33	\$37,742.00	\$23,521.00	\$6,156.00		
17/34	\$39,860.00	\$24,115.00	\$5,804.00		
18/35	\$40,311.00	\$23,899.00	\$5,289.00		
19/36	\$41,841.00	\$23,852.00	\$4,857.00		
20/37	\$41,841.00	\$23,167.00	\$4,339.00		
21/38	\$43,378.00	\$23,316.00	\$4,017.00		
22/39	\$43,378.00	\$22,639.00	\$3,583.00		
23/40	\$46,111.00	\$23,364.00	\$3,403.00		
24/41	\$46,516.00	\$22,881.00	\$3,065.00		
25/42	\$18,803.00	\$8,980.00	\$1,106.00		
26/43	\$18,803.00	\$8,719.00	\$987.00		
27/44	\$18,803.00	\$8,465.00	\$882.00		
28/45	\$18,803.00	\$8,219.00	\$788.00		
29/46	\$18,803.00	\$7,978.00	\$703.00		
30/47	\$18,803.00	\$7,747.00	\$628.00		
31/48	\$18,803.00	\$7,521.00	\$560.00		
32/49	\$18,803.00	\$7,302.00	\$500.00		
33/50	\$18,803.00	\$7,084.00	\$447.00		
34/51	\$18,803.00	\$6,883.00	\$399.00		
35/52	\$18,803.00	\$6,683.00	\$355.00		
36/53	\$18,803.00	\$6,488.00	\$318.00		
37/54	\$18,803.00	\$6,299.00	\$284.00		
38/55	\$18,803.00	\$6,115.00	\$253.00		
39/56	\$18,803.00	\$5,937.00	\$226.00		
40/57	\$18,803.00	\$5,765.00	\$210.00		
41/58	\$18,803.00	\$5,596.00	\$180.00		
42/59	\$18,803.00	\$5,433.00	\$161.00		
43/60	\$18,803.00	\$5,275.00	\$144.00		
44/61	\$18,803.00	\$5,121.00	\$128.00		
45/62	\$18,803.00	\$4,972.00	\$115.00		
46/63	\$18,803.00	\$4,827.00	\$102.00		
47/64	\$18,803.00	\$4,687.00	\$91.00		
48/65	\$18,803.00	\$4,550.00	\$82.00		
TOTAL	\$1,159,036.00	\$607,467.00	\$154,809.00	\$65,853.00	\$49,659.00

individual to advance to the next rank. This time difference clearly has an adverse impact on Nancy Nightingale leading to an earlier retirement at 20 years of service and a subsequent decrease in lifetime earnings based on an annual pension of only \$18,803.00 compared to \$41,340 earned by Adam Bookmaker for 30 years of service. Income A reflects earnings as they would appear had they not been adjusted for differences in promotion rates.

Income B was discounted by calculating the present value of future earnings at 3% and 12% for both individuals using the following formula: $P = F [1/(1+i)^n]$; where P = present value of the future amount, F = a future amount, i = interest rate, n = number of years. Total earnings to cost ratios were then calculated using the 3% and 12% figures and the findings reflected the higher rate of return experienced by Nancy Nightingale. At 3% the earnings to cost ratio was 7:1 for Adam Bookmaker and 9:1 for Nancy Nightingale. At 12% the earnings to cost ratios were 1.7:1 for Adam Bookmaker and 3.1:1 for Nancy Nightingale.

The net present value was then calculated for each individual by subtracting total costs discounted at 3% from total earnings discounted at 3% to arrive at a net present value for Adam Bookmaker of \$708,912.00 and \$541,614.00 for Nancy Nightingale. A marked change occurred in net present value when calculated at a 12% discount rate resulting in \$57,232.00 for Adam Bookmaker and \$105,150.00 for Nancy Nightingale. Finally, the internal rate of return was calculated and proved to be higher for Nancy Nightingale at 19% than for Adam Bookmaker at 13%.

Figure 4-5 displays the undiscounted income horizons for Nancy Nightingale and Adam Bookmaker from age 18 through age 65. This figure visually illustrates the differences between the two undiscounted income

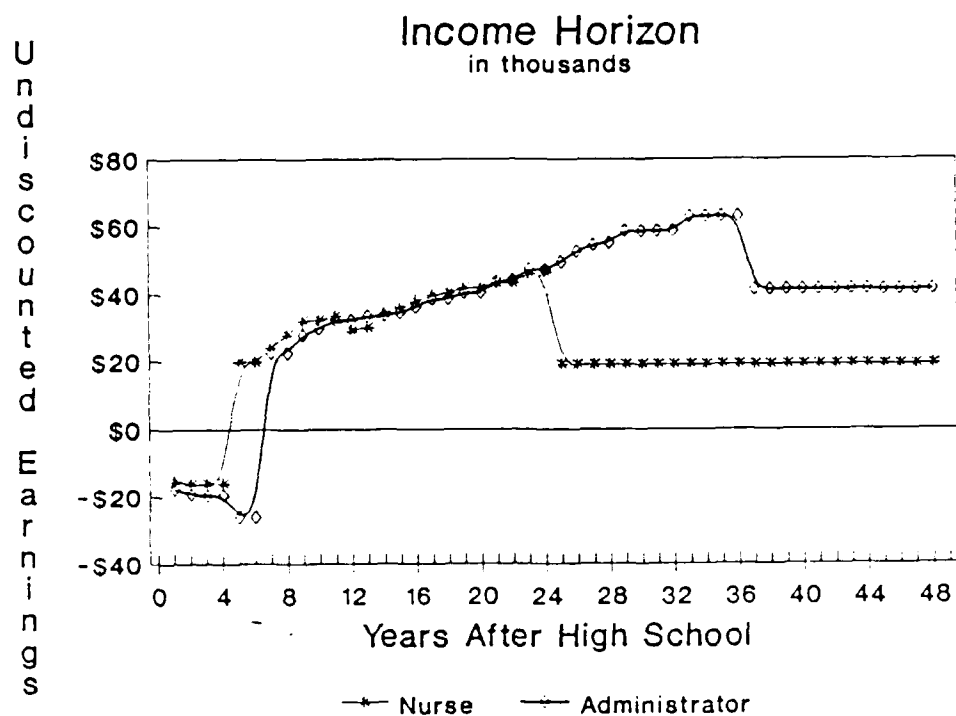


Figure 4-5

Comparison of Undiscounted Income Horizon Profiles

horizons showing Nancy Nightingale's initial smaller investment in education and opportunity lost and the slightly higher earnings she received. Nancy's earnings stream remained at a level slightly higher than Adam's, with the exception of year 12 and 13 when her earnings fell slightly as a result of tuition costs for advanced education, until the earnings of both streams crossed 21 years after both had completed high school. From this point onward through age 65 Adam's earnings stream was considerably higher due to Nancy's earlier retirement and, in turn, drop in earnings.

Research Question Three

The research findings do support research question three. There is a positive correlation between promotion rates and retention rates. The NC has shown a fairly steady decline in retention rates since 1981. Because of the comparatively large size of the NC a 1% drop in overall retention equates to a loss of 50 - 60 experienced nurses.

Table 4-7 gives the cohort retention rates by corps starting with the year each cohort group ended their initial obligation up through five years beyond if available. For example, out of the Nurse Corps cohort group that ended their initial obligation to the Air Force in 1983, 73% decided to remain in service. One year later (reading the column labeled FY-83 from top to bottom) retention had dropped to 61% for that same cohort group and 5 years after completing their initial obligation only 42% of that cohort group remained.

Patterns between promotion rates and retention rates can be seen by comparing Tables 4-1 and 4-7. These comparisons show that the NC experienced lower promotion rates to each of the field grade ranks in the first three years of the study period with a corresponding decrease in

Table 4-7

Retention Rates: NC, BSC, MSC**NURSE CORPS**

COHORT RATES: 1979-1987

Year of Initial Obligation

	FY79	FY80	FY81	FY82	FY83	FY84	FY85	FY86	FY87
Init. Obligation	.78	.66	.75	.75	.73	.72	.69	.70	.68
1 Year Beyond	.63	.55	.63	.65	.61	.64	.60	.61	.58
2 Years Beyond	.55	.50	.54	.56	.56	.56	.54	.52	
3 Years Beyond	.50	.45	.51	.53	.51	.51	.50		
4 Years Beyond	.45	.41	.47	.46	.47	.47			
5 Years Beyond		.37	.44	.42	.42				

BIOMEDICAL SCIENCES CORPS

COHORT RATES: 1979-1987

Year of Initial Obligation

	FY79	FY80	FY81	FY82	FY83	FY84	FY85	FY86	FY87
Init. Obligation	.60	.61	.73	.86	.78	.80	.80	.76	.77
1 Year Beyond	.53	.56	.66	.81	.69	.73	.71	.69	.71
2 Years Beyond	.48	.55	.61	.76	.62	.64	.65	.64	
3 Years Beyond	.45	.52	.57	.70	.59	.58	.62		
4 Years Beyond	.44	.50	.56	.66	.56	.54			
5 Years Beyond		.47	.52	.64	.50				

MEDICAL SERVICE CORPS

COHORT RATES: 1980-1987

Year of Initial Obligation

	FY80	FY81	FY82	FY83	FY84	FY85	FY86	FY87
Init. Obligation	.88	.91	.88	.93	.89	.92	.93	.90
1 Year Beyond	.82	.91	.84	.85	.84	.84	.90	.89
2 Years Beyond	.81	.91	.81	.80	.80	.78	.84	
3 Years Beyond	.79	.89	.78	.80	.79	.74		
4 Years Beyond	.79	.89	.77	.76	.78			
5 Years Beyond	.79	.89	.77	.75				

Note: FY denotes the fiscal year which runs from 1 Oct to 30 Sept.

retention rates seen from 1979 to 1980, the first year cohort data became available. In 1980 and 1981 promotion rates rebounded rising for each field grade category and as predicted retention rates responded in 1981 and 1982 rising above the lows experienced in 1980. In 1982 promotion rates declined in each grade category and again retention rates responded by dropping the following year (1983). In 1983 promotion rates improved slightly and the following year (1984) retention rates were either maintained or showed a slight improvement. For the next four years NC promotion rates fluctuated showing occasional improvement but for the most part a declining trend. This uncertainty in promotion opportunity translated into steadily declining retention rates for the Nurse Corps during this same four year period. In 1987 the Nurse Corps experienced its lowest retention rate of 68%, the lowest rate seen since the 66% rate in 1980.

The bivariate regression results reported in Tables 4-8 and 4-9 lent additional support to the comparative analysis made of Table 4-1 and 4-7. The results showed that there is a highly significant statistical relationship between promotion opportunity (Promotion) in any given year and retention rates experienced the following year (Beta weight = .81867, $F = 48.7752$, $p < .0001$). The results in Table 4-9 indicated that a one standard deviation increase in promotion rates across the three corps would lead to .8 of a standard deviation increase in retention rates. Because of the small number of observation years, it is not possible to disaggregate these results by corps.

Table 4-8

Promotion Rates on Cohort Retention Rates: Bivariate Regression:
ANOVA Table

Multiple R	.8187
R Square	.6702
Adjusted R Square	.6565
Standard Error	5.5413

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	1497.6775	1497.6775
Residual	24	736.9379	30.7058

F = 48.7752

Signif F = < .0001

Table 4-9

Promotion Rates on Cohort Retention Rates: Regression Coefficients

Variable	B	SE B	Beta	T	Sig T
Promotion	.0811	.0116	.8187	6.984	.0001
(Constant)	64.2437	2.3466		27.377	.0001

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

This retrospective descriptive study provided information as to how well women have fared relative to men in one organization (the USAF). Using Adams' equity theory as a guide, research was undertaken to discover whether members of a specific female-dominated employee group experienced inequity in compensation (promotion), when compared to members of other male-dominated employee groups in the organization. And, if so, did members of the disadvantaged group show a tendency to leave the organization in search of better employment opportunities. This chapter also makes recommendations for future research.

Research Question One

Do officers in the Nurse Corps, a female-dominated group, have lower promotion rates to field grade ranks than officers from the male-dominated Biomedical Sciences Corps or Medical Service Corps?

Discussion and Conclusions

Officers in the Nurse Corps, a female-dominated group, did have lower promotion rates to field grade ranks than officers from the male-dominated groups. The findings provided overwhelming evidence that promotion rates at the upper level, Lieutenant Colonel and Colonel ranks, for both male-dominated groups, MSC and BSC, were higher than promotion rates for the female-dominated Nurse Corps. At the lowest field grade rank, Major, MSC promotion rates remained higher than NC rates, however, BSC promotion rates at the Major rank in 7 out of 11 years analyzed were lower than comparable NC promotion rates.

Several factors accounted for this drop in promotion rates experienced by BSC officers. Because the Air Force has a closed personnel system, improving promotion rates depends on increasing the vacancy rate and/or decreasing the pool of eligibles. BSC retention rates increased for senior service officers during this period creating fewer vacancies as NC retention rates in both categories decreased creating more vacancies. Competition among BSC eligibles also increased during this period because physician assistants (PAs) became eligible to compete for 04 rank (PAs were part of the enlisted force until 1978 when they were incorporated into BSC). A closer examination of promotion rates revealed that the BSC elected to promote about twice as many APZ eligibles as the NC; this decreased opportunities for promotion for those in the primary zone (IPZ). In a closed system the only other way to increase promotion opportunity is to create more positions. Data on validated requirements showed the BSC experienced greater growth in the 05 and 06 ranks during this period and less at the 04 rank whereas the reverse was true for NC.

Findings obtained by calculating overall promotion opportunities for each group provided additional support for research question one. Overall promotion opportunities proved to be consistently lower for NC officers than officers from either male-dominated group, MSC or BSC. When validated requirements for each year were subjected to analysis a picture emerged of a "pyramid" squeeze occurring at upper levels in the hierarchy for NC officers. In addition, the findings revealed great differences between the Nurse Corps and the Medical Service Corps and Biomedical Sciences Corps when proportionally comparing upper and lower grade level requirements for each group to overall size of the group.

This study's findings of lower promotion rates and lower job levels in the hierarchy for women are consistent with reports found in the literature. Research studies of organizational hierarchies have reported the concentration of women at the bottom of the hierarchy (Blau & Ferber, 1985; Brown, 1979; Larwood & Wood, 1977). This same hierarchical pattern, showing women clustered at the base of the pyramid has also been described to be characteristic of health care organizations (Zoloth & Stellman, 1987). In fact, Astin and Bayer (1972) found that sex was a better predictor of organizational rank in academe than any other factor.

Data analysis revealed that the two male-dominated groups studied (MSC and BSC) outstripped the female-dominated group (NC) in total promotion opportunities. This tendency for men to dominate promotion opportunities has been reported in the literature (Baron & Bielby, 1985; Grimm & Stern, 1974; Mennerick, 1975; Talbert & Bose, 1977). In addition, the slower rate of promotions found for women has also been reported in numerous studies (Flanders & Anderson, 1973; Rossi, 1970; Roussell, 1974). Lower promotion rates for officers in the female-dominated NC reflect an identified historical trend of lower promotion opportunities for female officers in the Air Force (Holm, 1982).

Another interesting finding was the variation seen in promotion rates for the two male-dominated groups. At all three field grade levels analyzed MSC officers had higher promotion rates than either NC or BSC officers, although overall rates for BSC officers still exceeded NC rates. Dissimilarity in occupational composition may offer an explanation for the difference observed in BSC and MSC promotion rates. The Biomedical Sciences Corps is composed of officers from 17 different health occupations, 6 female-dominated and 11 male-dominated according to

1980 census data for health occupations (U.S. Department of Health and Human Services, 1985). On the other hand, officers in the Medical Service Corps have degrees in either business or health administration, both male-dominated career fields, making them considerably more homogeneous than BSC officers.

Discrimination. Results showed that during the eleven year period analyzed (1977-1987) promotion rates to field grade ranks for the female-dominated group (NC) were consistently lower than promotion rates for the two male-dominated groups (MSC and BSC). Promotion rates to the two highest ranks reflected the greatest disparity between the three groups studied. These findings suggest inequity in promotion opportunities for NC officers. Disproportionate grade ratios at the upper level between NC and MSC and NC and BSC remained constant throughout the eleven year period, and could be explained as appropriate because of the lack of change seen in the disparity in ratios over this period or as inappropriate because of persistent discrimination against the Nurse Corps. The analysis also implies that policies which govern the distribution of grade level requirements are not uniform across the health professions corps. Whether this inequity in upper level ranks (Lt. Colonel and Colonel) reflects differences among individual group members, such as superior qualifications for command positions, or discriminatory practices can not be determined within the scope of this analysis.

A review of the literature revealed that unequal access to the avenues of advancement within organizations is a principal source of inequality (Kalleberg & Sorensen, 1979; Spilerman, 1977). Several

reasons have been proposed to account for differential treatment of men and women. Human capital theorists suggest that lower promotion rates are the result of women's intermittent work patterns, dropping out of the labor force for a period of time for marriage, childbearing, and childrearing. However, intermittent work patterns resulting in lower seniority and organizational experience do not explain AF promotion rates since officers are only considered for promotion if they meet the criteria for length of service and time in grade.

Another reason frequently cited for differences in promotion rates and job levels between men and women is that employers demonstrate a taste for discrimination (Becker, 1957). The Air Force may be satisfying an implicit preference for males in command and leadership positions by insuring greater promotion opportunity to the higher ranks for members of male-dominated groups. Stereotypical beliefs about a women's inability to fill a leadership/command role or a belief that male officers will "not work for women" are examples of this kind of discrimination described in the literature (Heilman, 1983; Kanter, 1977; Schein, 1978; Simpson & Simpson, 1969; Thomas, 1987). This could explain the greater disparity in Air Force promotion rates found at the two highest ranks (Lt. Colonel and Colonel). However, this disparity seen in promotion rates could also result in error discrimination, caused by underestimating the abilities of NC officers.

While human capital theorists attempt to explain differences in promotions on the basis of choice, structural theorists believe that differential labor market outcomes for men and women are a result of

discrimination by occupational segregation within organizations. The concept of a dual labor market (Doeringer & Piore, 1971), having primary and secondary jobs was suggested to explain inequity stemming from job discrimination. Primary jobs were characterized as having fewer lower level positions and longer promotion ladders leading to a more stable work force because of high wages, good opportunity for advancement and job security. Secondary jobs were characterized as having easy entry due to numerous lower level positions and shorter promotion ladders discouraging worker stability because of lower wages, limited opportunities for advancement and little job security. The findings of this study appear to indicate the existence of a dual labor market in the Air Force segregated by occupation into corps.

The two male-dominated corps (MSC and BSC) have characteristics associated with the primary jobs: fewer lower level positions, longer promotion ladders, better retention indicating stability, higher wages due to higher rank attainment, and better job security based on a greater likelihood of reaching Lieutenant Colonel. Nursing has already been described as belonging to the secondary job group (Treiman & Hartmann, 1981). Results of this study would appear to support that classification (secondary job) for the Nurse Corps: more lower level positions, shorter promotion ladders, lower retention rates indicating instability, lower wages from decreased promotion opportunities, and little job security.

Promotion and authority. One result of lower NC promotion rates to the highest ranks in the military is that women (nurses) have less authority and influence in the military health care system because nurses occupy fewer command positions as a result of their lesser rank. The limited power and authority of Nurse Corps officers (women) has the

potential of limiting the effectiveness of Air Force health care.

Although the NC has the largest number of officers among the five health professions corps in the Air Force and a nursing service department typically represents one third of any hospital's staff, the power and authority of NC officers in the military environment is limited because of the lower ranks of NC officers. Fewer upper level positions for women (NC officers), as was found in this study, were consistent with earlier research that showed women were much less likely to be in positions of power in the workplace (Grimm & Stern, 1974). For example, Wolf and Fligstein (1979) were able to show the importance of differences in work autonomy and authority in explaining gender inequality in the workplace.

Several reasons could be given to account for the inequality in grade ratios and promotion rates at the lieutenant colonel and colonel ranks: (a) superior qualifications of MSC and BSC officers, (b) needs of the Air Force, (c) organizational growth, and (d) employer "taste" for discrimination, in this case, the Air Force prefers males in upper level leadership positions. In the Air Force, members of each corps compete among themselves for promotion slots allocated that year for each grade category. Rather than differential treatment for female officers (nurses) occurring in the promotion selection process, differential treatment would probably be seen in the job evaluation process of validating requirements to determine the number of promotion slots available to each specific corps.

Malkiel and Malkiel (1973) found that in civilian settings only half of the sex differences in job levels between males and females could be explained by either education or experience. In the Air Force, superior

qualifications could account for the sustained higher promotion rates to Lieutenant Colonel and Colonel ranks seen for the male-dominated groups if additional education had been incorporated into the job analysis of work centers to determine grade requirements. However, data attained on years of schooling were incomplete in the present study, and did not permit an indepth analysis of differences in educational credentials. A hypothetical scenario developed for this study (see pp. 66-69), which represented average investments in education by group members was used instead. This scenario showed somewhat lower rates of return on investment in education to MSC officers than to NC officers.

The number and grade level of officers needed in each corps is based on job requirements necessary to complete the mission of the Air Force. Job evaluation systems generally measure skill, effort, responsibility, and working conditions to determine requirements. Gender bias can occur if more weight is given for tasks that are performed more often in male-dominated jobs. Unfortunately, an analysis of the AF job evaluation system is beyond the scope and resources available for this study.

Research has established that promotion opportunities are heavily dependent on rates of organizational growth (Stewman & Konda, 1983). Growth occurs in the Air Force by year-to-year changes made by Congress in authorized strength levels which affects the field grade ceilings. Changes in the force structure are strongly related to changes in the budget. One could argue that reductions made in the officer force should be uniformly distributed among the competitive categories. However, the findings showed inequity between male-dominated and female-dominated corps in grade levels and promotion rates.

Because of overall budgeted restrictions in grade ceilings any increase in field grade ranks in one corps would be at the expense of other corps. Kanter (1977) has shown that under conditions of resource scarcity sudden increases in job related rewards to a minority group can engender feelings of hostility in the majority group that they would be crowded out of the distribution. The dominant group may then be pressed to use their power to try to prevent further gains being made by the minority group. This situation may be reflected in the distribution of promotions and rank in the USAF which tend to favor the male-dominated groups (MSC and BSC) over females, nurses in the Nurse Corps.

This situation has been suggested as affecting nurses in civilian life. Noted economist Eli Ginzberg (1981) in his analysis of the future of nursing commented that:

Persons at the top of the totem pole often come to assume that they are there by virtue of right, not as a result of history and tradition. They are loathe to cede any part of their authority and privilege and they see no reason why what was should not continue to be . . . There appears to be a growing hostility, dissatisfaction, and alienation among nurses with collegiate and higher degrees--and many with less credentials--regarding their on-the-job relations with physicians and hospital administrators. (p. 32)

Indications are that stereotypes about females may affect promotions (Nieva & Gutek, 1981). According to Schein (1978) managerial competence is equated with male competence and this may affect a women's ability to advance to executive levels within an organization (Bass et al., 1971). The restriction of female NC officers from positions of authority may similarly stem from stereotypical beliefs about their ability or commitment to the Air Force leading to an AF preference for males in

higher level positions. Exclusion from higher positions of authority makes it more difficult for AF nurses to become active participants in decision-making. Negative stereotypical views about women can lead to the exclusion of NC officers from the informal political network within the organization making it more difficult to accomplish their mission objectives as well as advance up the ranks.

Effects of limited promotions. A review of the literature showed that in a study of four industrial organizations done by Hulin and Smith (1964), women were more dissatisfied with their promotion opportunities than any other factor. It has already been reported that success for an officer in the Air Force is defined as achieving Colonel rank. Failure to achieve success within organizations has been described as leading to frustration, depression, and alienation (Bardwick, 1983). Bardwick (1983) believes that because women have a tendency to be plateaued earlier in their careers they can become especially bitter; more so, if they chose career over family or believed in the feminist message that a career would bring fulfillment.

According to equity theory if opportunity for achieving success within an organization appears unfairly constrained an employee will become dissatisfied. Dissatisfied employees tend to exhibit various behaviors that can prove detrimental to an organization such as: lowering morale by complaining to co-workers, decreasing personal productivity, sabotaging production, increasing absenteeism, and transferring or quitting the organization. Experts representing various health care organizations have recently testified that nurses are dissatisfied with limited opportunities for advancement. Letters to the editor appearing in the Air Force Times (Bostek, 1988; Kiehle, 1988) have

indicated that many AF nurses are dissatisfied with their promotion opportunities. As an all volunteer force, the Air Force has to rely heavily on the positive attitude of its members to attract others to military service especially when resources are scarce, such as during a national nursing shortage.

Research Question Two

Do officers in the Nurse Corps, a female-dominated group, have lower rates of return on investment for education than officers in the Medical Service Corps?

Discussion and Conclusions

Data analysis did not support hypothesis two. In the hypothetical scenario created for the study (pp. 66-69), Nancy Nightingale (NC officer) received a greater return to overall investment in human capital, with an earnings to cost ratio of 9:1, than Adam Bookmaker (MSC officer) with an earnings to cost ratio of 7:1. The major factor accounting for this greater return was the timing of the investment in education. The NC officer invested four years of training after high school versus six years invested by the MSC officer. This difference meant that the NC officer entered the Air Force earlier giving her an initial advantage in rank and in turn earnings based on more time in service.

Although overall tuition costs were similar, a \$2022.00 difference between Nancy and Adam, the greater disparity was found in opportunity costs from lost income, a \$53,293.00 difference, which significantly affected overall education and lost opportunity investment costs and returns. However, gender discrimination was already to some degree built

into this equation since mean earnings used to calculate opportunity costs were greater for males than mean earnings for females with equivalent education. The assumption being that the effects of all possible factors influencing earnings are different for men and women. This difference is clearly an economic reality today (see U.S. Department of Commerce, 1988) and therefore, was used in this scenario in a concerted effort to reflect real world career experiences. Another method commonly used is to measure the amount a women's lifetime earnings would increase if her investments were the same but her earnings were calculated at male rates. In other words, if lost income had been valued for the female officer the same as for the male officer and if the NC officer had adjusted the timing of her advanced education to match that of the MSC officer the research question would then have been supported as was found in earlier research on male and female earnings differentials (Treiman & Terrell, 1975).

Because the majority of research has failed to explain the difference in earnings for females in comparison to males, given equal education levels, the focus has shifted from individual employee characteristics to examining possible structural constraints in the marketplace, such as the AF promotion system. The findings in this study showed that in real dollar figures Nancy Nightingale's lifetime earnings measured as: unadjusted (income A), adjusted (income B), and discounted 3% were lower than Adam Bookmaker's. However, when both earnings streams were discounted at 12% Nancy Nightingale surpassed Adam Bookmaker by a difference of \$11,830.00. This reflects Nancy's early gains in salary based on her entry into the service and unconstrained promotion opportunities at company grade ranks (2nd Lieutenant, 1st Lieutenant, and

Captain). A marked difference appears later in their careers stemming from higher promotion rates to field grade ranks (Major, Lieutenant Colonel, and Colonel) which allowed Adam to attain colonel rank (O6) and increase his retirement income.

In addition, Adam Bookmaker enjoyed a longer Air Force career by 10 years over Nancy Nightingale as a result of higher MSC promotion rates to all field grade ranks. Lower NC promotion rates and DOPMA legislation restricted Nancy Nightingale from continuing her career beyond 20 years accounting for a widening in the gap between their earnings streams.

Another consideration not accounted for in this analysis is the toll on an employee's psyche when bypassed for promotion and eventually forced out of the organization. Psychic returns should be measured and assessed as part of "income" by including prestige or status, sense of achievement, positive attitude, and self-esteem in the analysis.

When internal rate of return was calculated by incorporating the time value of money Nancy Nightingale showed a greater return for her smaller investment in education and lost opportunity. Again, this was specifically related to the timing of her educational investment and the lower earnings used to calculate opportunity costs. In real dollar amounts her total lifetime earnings were less than Adam Bookmaker's and her career plateaued earlier resulting in a significant difference in retirement income. Adam Bookmaker's decision to invest early in his career eventually resulted in a greater income than Nancy Nightingale in real dollars and in prestige if measured by rank attainment and the Air Force definition of success.

Career choice. Economists perceive outcomes in the labor market to stem from individual career choices. Lloyd and Niemi (1979) explain:

The decision to go to college involves weighing the net gains, in terms of increased future income (total gains minus direct schooling costs) and increased knowledge, against the value of alternatives foregone (opportunity costs), such as working full time or raising a family. (p. 2)

The assumption of Lloyd and Niemi (1979) was that men and women are similar in their freedom to choose a career. However, this assumption fails to consider possible gender discrimination built into the socialization of male and female children and the affect that such discrimination may have on later career choices. It also fails to account for the impact employers have on a women's career choice. Discriminatory hiring and promotion practices of employers may discourage women from entering certain occupations or from remaining in them (i.e., nursing) because they believe that opportunities to use the acquired training will be closed to them. The wealth of less gender biased information available today to young women undoubtedly has had and will continue to have an affect on the career choices they make. The American public needs nurses, the military needs nurses but nursing schools are continuing to see declining enrollments (U.S. Senate Committee on Finance, 1988). Organization promotion practices that limit the growth, earnings, and authority of women may inadvertently be contributing to a decline in the future supply of qualified nurses, directly affecting the viability of health care organizations (Consolvo, 1979; Kahne, 1968; Price, 1977; Revans, 1964).

Hidden rewards and costs. The findings showed that because Nancy Nightingale (hypothetical nurse officer) invested less at the outset of her military career she enjoyed a greater lifetime economic return to her smaller investment. For Adam Bookmaker (hypothetical MSC officer) the earlier investment in education while foregoing earnings had a longer

payoff period and eventually resulted in a greater real dollar income and a greater prestige by his attainment of the highest rank (colonel).

Under the present pay system in the military, all officers of the same rank with the same number of years in service receive the same amount of basic pay. The underlying concept of this pay system is that all officers of the same rank and experience contribute equally to National Defense (Binkin, 1981). The military pay system differs from civilian systems which generally pay workers based on the context and content of the work they perform. This creates problems for military organizations because they must compete with the civilian sector to attract and retain qualified workers. According to Binkin (1981) "the nearly total absence of occupational differentials is by far the most striking feature of the military pay structure" (p. 27).

Much more than civilian systems, the military uses promotion to a higher rank to compensate officers for increased knowledge, expertise, and experience. The results of the hypothetical scenario used in this study suggest that the Air Force recognizes the extra cost incurred for foregone earnings and for advanced degrees by structuring promotion ladders to attract and retain officers who incur greater costs associated with advancing their education. This study suggests that the Air Force may have been relatively successful in equalizing rate of return to investment through the use of promotions. Adam Bookmaker received a greater real dollar income, if lower return; a longer career; greater job security; more status; a more challenging command role; and a larger retirement pension.

Although Nancy Nightingale did invest the same number of years in schooling, she did not incur the same opportunity costs (\$53,293 less)

because she earned her advanced degree while working full-time. The scenario suggests that Nancy was economically rewarded for her lower investment in education and lost opportunity by achieving a higher rate of return on overall investment. However, the benefits achieved by a higher economic return should be measured against any additional costs to her career. According to the results obtained from Nancy's income horizon, she received a lower gross real income, a shorter AF career, had more job insecurity, less prestige, less power and authority in the workplace, and a lower retirement pension. In addition, as Bardwick (1983) described in her discussion of the affects of career plateauing, the sociopsychological impact of having failed to achieve career "success" needs to be considered.

The findings would suggest that NC officers are better off economically on a rate of return basis but are disadvantaged in terms of total income and in power and authority in the work setting. The question becomes whether promotions as compensation should be used to equalize returns to investment or would promotions be better used to meet the command responsibility needs of the Air Force. This creates a dilemma for the Air Force, equalizing authority or attracting people with the skills needed. Many economists would say that a salary and wage scale should be used to equalize returns to investment rather than using command authority via promotions to equalize returns. Binkin (1981) in his study of military pay recommended overhauling the system by realigning job grades based on a detailed assessment of mission demands, position requirements and inventory.

Binkin (1981) also believed grade restructuring would reveal a need for occupational mobility to equalize opportunities for advancement. For example, if Air Force needs are higher in MSC and BSC than in NC for

upper level positions then perhaps NC officers who have extensive clinical, administrative, and military experience should not be separated or retired but moved laterally into corps having greater promotion opportunities, even if this requires some in and out of service training.

Research Question Three

Would a decrease in opportunity for promotion during the eleven year period be associated with a decrease in officer retention rates in the three corps studied?

The analysis in this study clearly showed that promotion opportunity was related to retention rates. A comparison was made between raw promotion percentage rates by grade and year for each corps using retention rates for cohort groups. In every category compared NC sustained consistently lower retention rates than MSC or BSC for the period examined. A bivariate regression analysis that investigated the relationship of promotion opportunity on retention rates showed a strong correlation between the retention rates and promotion opportunity (Beta weight = .81867, $p < .0001$). The regression accounted for 66% of the variance between the two variables.

Compensation and retention. Research has shown that individuals tend to join and remain in those organizations that provide the most desired rewards (Mobley et al., 1979; Porter & Steers, 1973; Steers & Rhodes, 1978). Researches have also shown that high reward levels lead to greater satisfaction which is associated with lower turnover (Porter & Steers, 1973). Seybolt (1986) identified the level of consistency and equity in organizational policies across work groups as a critical issue in retention.

What affect historical patterns of limited promotion opportunities for women (Holm, 1982) have had on Air Force NC retention is open to speculation. However, recent articles appearing in the Air Force Times (Bostek, 1988; Kiehle, 1988) suggest that limited promotion opportunities offer an explanation for declining NC retention. Kanter (1977) believes the adaptive response by women to historical patterns of discrimination has been resignation. She supports the idea that structural problems (i.e., compensation policies) are at the root of women's lack of progress in organizations. Evidence shows those employees who are structurally plateaued are the ones most likely to leave. This is confirmed by Bardwick (1983) who explains that, "the response to being plateaued, especially for those with a history of success, is logically alienation" (p. 68). She further states that women, "are particularly likely to view being plateaued as a betrayal by the corporation-as-family" (p. 68).

Job security. Job security has been defined "in terms of power to maintain career continuity" (Greenhalgh, 1983, p. 251). As this analysis has shown promotion rates for NC officers to lieutenant colonel have remained consistently low for the last eleven years. Also, coefficients of variation reveal NC officers have a greater uncertainty in promotion opportunities from year-to-year than officers in other corps. According to the 1981 Defense Officer Personnel Management Act, which made changes to the promotion system, tenure to retirement is not guaranteed for officers below the rank of lieutenant colonel. DOPMA legislation also mandates that officers twice passed over for promotion to lieutenant colonel be separated from the service unless selected to continue for a specified period of time on active duty or unless the officer is within two years of eligibility for retirement (18 years of service).

According to Nancy Nightingale's income horizon, if (as was assumed) she had not been selectively continued on active duty she would have been separated without retirement from the AF at the Captain rank as mandated by DOPMA legislation. Separation without retirement benefits would have made all of Nancy's (hypothetical nurse officer) economic returns far below those of Adam Bookmaker (hypothetical MSC officer). Clearly, job security has now become a concern for NC officers as low promotion opportunities are maintained and more and more reductions in the officer force are ordered by Congress to control budget expenditures. If pressure for "belt-tightening" causes the AF to alter current policy to follow strict adherence to DOPMA legislation, the probability of nurses choosing the Air Force as a career would dramatically decline because their return to investment without obtaining retirement income would be much smaller. Job insecurity stemming from the limited promotion opportunity provides one explanation for the sustained low retention rates in the NC seen during this period. Limited opportunity for career continuity for NC officers significantly alters the exchange relationship outlined by Adams (1965), undoubtedly affecting decisions to participate in or contribute to the organization.

Summary of Findings

According to Adams' (1965), inequity exists for individuals whenever they perceive their ratio of outcomes to their inputs to be unequal when compared to the ratio for others in the organization. A comparative analysis of promotion opportunities for three separate Air Force officer groups (NC, MSC, and BSC) revealed inequity in promotion opportunities for the female-dominated Nurse Corps over the eleven year period analyzed.

The economic affect of this differential promotion opportunity was examined by calculating rates of return on investment for an NC and MSC officer using hypothetical career earnings streams based on NC and MSC pay and promotion rates for the years studied.

Nancy Nightingale, the hypothetical nurse, did earn a higher rate of return than the hypothetical MSC officer based on her smaller investment but hidden career costs accompanied this gain. A comparative analysis of retention rates found NC rates were consistently lower than both MSC and BSC rates during the eleven year period. A bivariate regression performed with the study variable, promotion opportunity, on the dependent variable, retention, revealed that both variables were strongly positively correlated.

The findings revealed there are inequities in promotion rates between male-dominated and female-dominated corps and that opportunity for promotion is significantly correlated with retention. This study suggests that inequity in promotion rates for nurses during this eleven year period could have created sufficient dissatisfaction in NC officers to have negatively affected AF retention.

The need for nurses is rapidly increasing as the population ages and technology advances. Yet, nursing school enrollments are declining forcing some schools to close their doors (U.S. Senate Committee on Finance, 1988). The Department of Defense (DOD) has just proposed opening a four year school to train military nurses, the first such project since the Army School of Nursing was closed in 1933 (Chow, Hope, Nelson, Sokolski, & Wilson, 1978). DOD also recently proposed new compensation measures to entice nurses into the Air Force. If adopted this would be the first time a bonus was ever paid to military nurses

(Willis & Balman, 1989). Nurses are leaving hospitals at an alarming rate, and AF nurse retention rates have steadily declined since 1981.

The continuation of this current nurse shortage both in the civilian sector as well as in the Air Force indicates that previous measures to solve this crisis have not been effective. This study supports the premise proposed by other researchers that the solution to the problem lies within the structure of health care organizations. This study's findings suggest that the financial and psychic rewards that accompany a promotion have a strong impact on the decision a nurse makes about whether to join or remain in an organization. A striking feature of organizational and nursing research is the virtual absence of empirical studies on promotions and career mobility within organizations. Perhaps, this is because promotions and lateral transfers have been an uncommon experience for most nurses.

Recommendations for Future Research

Based on the findings of this study the following recommendations for further research are made:

First

The scope of this study was necessarily broad and exploratory in nature because of the paucity of research in this area. Additional analysis of various intra-organizational promotion patterns may further isolate the barriers that currently limit promotion opportunities for some groups. Military organizations offer a wealth of research possibilities that have gone almost unrecognized by current researchers. The military establishment is extremely large, complex, hierarchical, and patriarchal, providing a highly diversified number of occupations for researchers to study.

Health care organizations are also patriarchal, complex, and highly stratified. In addition, both military and health care organizations have occupations that are classified in the primary and secondary labor markets. How the promotion and retention patterns of various subgroups within these organizations conform to current social and economic theories of stratification, career mobility, and discrimination would greatly expand our understanding of complex organizations.

Second

Specific characteristics of the three health profession corps studied in this research (MSC, BSC, & NC) also offer additional possibilities for studies of careers and promotions within the Air Force. For example, the BSC is composed of 17 different health occupations, some male-dominated and some female-dominated. One recommendation is to investigate whether promotion rates vary between officers from each of the professional fields within the BSC.

Another recommendation would be to divide officers from the BSC, MSC, and NC into two groups: clinical and nonclinical. Bioenvironmental and environmental health officers in the BSC group are suspected to have higher promotion rates than officers in clinical practice. MSC officers have higher promotion rates than NC officers. Perhaps this does not represent discrimination based on gender but rather discrimination based on how closely the officer's occupational work resembles work performed in the Line-of-the Air Force (LAF). In other words, structural positions that are highly visible to and valued by the LAF might be more readily accepted and therefore receive a greater share of the organizational rewards.

Still another recommendation in this research area would be to explore differences in promotion rates, hierarchical levels, and retention rates between two female groups: Nurse Corps officers who are visibly concentrated into a readily identifiable competitive category and female officers integrated into the LAF whose visibility as a minority group is considerably less obvious.

Third

Economic researchers have discovered that lower earnings for women are strongly related to job assignment at lower levels within the organization. The findings from this study have revealed consistently lower grade levels are being assigned to the female-dominated corps.

According to Malkiel and Malkiel (1973) it is easier for a discriminating organization "to assign women to lower job levels and then set up a pay structure by level that is the same for both sexes" (p. 704). A recommendation is made to conduct a content analysis of the job evaluation system used in the AF that determines grade levels to discover to what extent "male" measures are used as factors in ranking or classifying the value or worth of a job to the organization. Also, how much weight is given to the number of people supervised in determining grade levels, since the size of the NC does not appear to have affected grade level determination as is common in the civilian sector.

Another research direction would specifically focus on military nurses to determine what weight is given in the job evaluation process to the central role nursing plays in military medical combat readiness. Still another recommendation would be to conduct a content analysis of job descriptions for female-dominated occupations within the Air Force or other health care organizations to assess the extent to which traditional

stereotypes are used in these descriptions. The intent here is to discover the effects, if any, of stereotypical bias in determining grade level assignment within the organization.

Fourth

Numerous job satisfaction surveys of nurses have already been done in the Air Force and in health care organizations. Another approach in this research area would be to specifically target interviews to those nurses who have already made the decision to leave the Air Force. Exit interviews would focus on the source of dissatisfaction that led to the individual employee's decision to leave the organization.

Another recommendation in the area of career decisions would be to look at the actual decision process individuals go through in choosing nursing as a career. What labor market information is used? What weight is given to economic factors? What type of career counseling did they receive in high school? In nursing school?

Final Thoughts

Commenting on the nursing profession in 1983 Weiss reflected that:

The nursing profession's lack of influence in health care is not of recent vintage. It is the outcome of deeply held beliefs regarding health care relationships. Unquestionably, the sociocultural perception of women and their role in society has weakened the potential contributions of the profession significantly.
(pp. 77-78)

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BIOGRAPHICAL SKETCH

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[REDACTED]

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a thesis for the degree of Master of Science in Nursing.

Arthur R. Williams
Arthur R. Williams, Chairperson
Associate Professor of Nursing

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a thesis for the degree of Master of Science in Nursing.

Diane R. LaRoche
Diane R. LaRoche
Professor of Nursing

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a thesis for the degree of Master of Science in Nursing.

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This thesis was submitted to the Graduate Faculty of the College of Nursing and to the Graduate School and was accepted as partial fulfillment of the requirements for the degree of Master of Science in Nursing.

August, 1989

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